THE LANCET

A Journal of British and Foreign Medicine, Surgery, Obstetrics, Physiology, Chemistry, Pharmacology, Public Health, and News.

Telegrams—LANCET, WESTRAND, LONDON. *Telephone*—GERRARD 4314 & 4315. *Offices*—423, Strand, London, W.C.

No. XIV. OF VOL. I., 1929. **No. 5510. Vol. CCXVI.**

LONDON, SATURDAY, APRIL 6, 1929

Founded 1823. Registered as a Newspaper. Published Weekly.

Pp. 128—Price 1s.

Annual Subscription Inland £2 2s. Abroad £2 10s.

NOW READY. 62 Illustrations. 15s. Postage 9d.

AN EPOCH MAKING BOOK

Telling of a Great British Success at THE WESTMINSTER HOSPITAL.

RADIUM TREATMENT OF CANCER.

By STANFORD CADE, F.R.C.S., Assistant Surgeon, Westminster Hospital.

TWO LEADING REVIEWS:

"*. . . . a technical work, such as Mr. Cade's, will prove of inestimable value, and we cannot recommend too strongly that every surgeon who has hitherto not had the opportunity to employ radium should read this volume very carefully.*"—BRIT. MED. JOURNAL.

"*. . . . We strongly advise any surgeon who thinks of taking up the treatment of cancer by radium to read very carefully this excellent text-book.*"—THE LANCET.

London: J. & A. Churchill, 40, Gloucester-place, Portman sq., W.1.

OXFORD MEDICAL PUBLICATIONS.

SEE PAGE 3.

DISEASES OF THE INTESTINES.

By A. P. CAWADIAS, O.B.E., M.D. (Durham and Paris), M.R.C.P. London.

¶ "One of the best descriptions of the diseases of the intestines that has appeared for many years."

—JOURNAL OF AMERICAN MEDICAL ASSOCIATION.

"While giving plenty of references to the literature, shows evidence of independent thought."—BRITISH MEDICAL JOURNAL.

Demy 8vo. Pp. xiv. + 300. With 62 Illustrations. Price 16s. Postage 9d.

Baillière, Tindall & Cox, 7 & 8, Henrietta-street, London, W.C. 2.

NOW READY. Size 8½" × 5½". Pp. xiv + 148. With 3 Plates. Price 6s. Postage: Inland, 6d.; Abroad, 8d.

SOME METHODS FOR

THE PREVENTION OF TUBERCULOSIS

By W. BOLTON TOMSON, M.D., Medical Superintendent of the "Sea View" Sanatorium, St. Leonards-on-Sea; Chairman of the Tuberculosis Care Committee for the Borough of Hastings.

Baillière, Tindall & Cox, 7 & 8, Henrietta-street, London, W.C.2.

METHODS AND USES OF

HYPNOSIS AND SELF-HYPNOSIS.

By BERNARD HOLLANDER, M.D. 6s.

Dr. Hollander's new book is the result of thirty years' experience of experimental hypnosis and hypnotic treatment, and contains directions how to apply hypnotism for the treatment of functional nervous and mental disorders and moral failings, as well as detailed evidence of phenomena throwing light on the mysteries of thought-transference, clairvoyance, etc.

Geo. Allen & Unwin, Museum St., London, W.C.1.

CANCER OF THE BREAST

AND ITS TREATMENT.

By W. SAMPSON HANDLEY, M.S., M.D. Lond., F.R.C.S. Eng.

Second Revised Edition. With 52 Illustrations. 30s. net.

Published for the Middlesex Hosp. Press by John Murray, London.

With 16 plates. Demy 8vo. 9s. net. Postage 5d.

PYELOGRAPHY:

ITS HISTORY, TECHNIQUE, USES AND DANGERS.

By ALEX. E. ROCHE, M.A., M.D., M.Ch., F.R.C.S.

With an Introduction by SIR JOHN THOMSON-WALKER, F.R.C.S.

". . . will be of great use . . . . an up-to-date treatise."—B. M. JNL.

London: H. K. Lewis & Co. Ltd., 136 Gower-street, W.C.1.

SECOND ENLARGED EDITION. With an additional plate at 15s. net; post free, inland 15s. 9d., abroad 15s. 6d.

CONTRACEPTION

ITS THEORY, HISTORY AND PRACTICE.

A Manual for the Medical and Legal Professions and all Social Workers.

By MARIE CARMICHAEL STOPES, D.Sc., Fellow of University College, London.

Introduction by the late Prof. Sir WILLIAM BAYLISS, F.R.S.

Introductory Notes by Sir JAMES BARR, M.D., Dr. C. ROLLESTON, Dr. JANE HAWTHORNE, and "Obscurus."

A few press opinions of the 1st Edition:

MEDICAL TIMES.—"The book is unique and marks a new era."

THE LANCET.—"Much of the evidence contained in the book is quite unobtainable elsewhere."

Sir Archdall Reid in NATURE.—"Some such book as this had to be written, and this is very well written."

MED. REV.—"Should be read by all interested in racial welfare." This book is the first manual on the subject, and is packed with both helpful and interesting matter and much that is new and noteworthy.

London: John Bale, Sons & Danielsson, Limited, 83-91, Great Titchfield-street, Oxford-street, W. 1.

JUST PUBLISHED. Demy 8vo. 96 pp. 6s. net. Postage 5d.

NOTES ON CHRONIC OTORRHŒA

WITH ESPECIAL REFERENCE TO THE USE OF ZINC IONIZATION IN THE TREATMENT OF SELECTED CASES.

By A. R. FRIEL, M.A., M.D. (Dub. Univ.), F.R.C.S.I.

Bristol: John Wright & Sons Ltd. London: Simpkin Ltd.

NOW READY. **4/6 net.**

THE TREATMENT OF

CHRONIC DEAFNESS

BY THE ELECTROPHONÖIDE METHOD OF ZUND-BURGUET.

By GEORGE C. CATHCART, M.A., M.D.,

Consulting Surgeon to the Throat Hospital, Golden-square.

Oxford University Press, Amen House, London, E.C.4.

STERILITY IN WOMEN.

By ARTHUR E. GILES, M.D., B.Sc., Ch.B., F.R.C.S., M.R.C.P., Senior Surgeon to the Chelsea Hospital for Women; Gynæcologist to the Prince of Wales's General Hospital, Tottenham.

Demy 8vo. Cloth. 213 pages, Illustrated. Price 10s. net.

"For the General Practitioner this is an ideal book, full of information."—MEDICAL WORLD.

"The best that has been written on the subject."—BRIT. MED. JR.

Oxford University Press,
Humphrey Milford, Amen House, London, E.C.4.

BY THE SAME AUTHOR.

DISEASES OF WOMEN (with Sir JOHN BLAND-SUTTON). 8th Ed. William Heinemann.

GYNÆCOLOGICAL DIAGNOSIS. } Baillière,
AFTER RESULTS OF ABDOMINAL OPERATIONS } Tindall & Cox

LEWIS'S PUBLICATIONS

With 13 Plates and 30 other Illustrations. Demy 8vo. **12s. 6d.** net; postage 6d.

A SHORTER SURGERY

A Practical Manual for Senior Students,

By **R. I. McNEILL LOVE,** M.B., M.S.Lond., F.R.C.S.Eng., First Surgical Assistant, London Hospital, &c.

"A short and unquestionably trustworthy guide . . . easily the best short book on surgery available."—MEDICAL PRESS.

JUST PUBLISHED. With 52 Illustrations. Crown 8vo. **5s.** net; postage 3d.

BRANCHIAL CYSTS

and other Essays on Surgical Subjects in the Facio-Cervical Region.

By **HAMILTON BAILEY,** F.R.C.S. Eng., Surgeon, Dudley Road Hospital, Birmingham; late Assistant Surgeon, Surgical Registrar and Tutor, Liverpool Royal Infirmary, &c.

With 273 Illustrations. Crown 8vo. **12s. 6d. net; postage 6d.**

MINOR SURGERY

By **LIONEL R. FIFIELD,** F.R.C.S. Eng., late Surgical First Assistant and Registrar, London Hospital; Author of "Infections of the Hand," etc.

". . . absolutely up to date . . . can be confidently recommended in the teaching, study and practice of minor surgery."

—BRITISH JOURNAL OF SURGERY.

With 25 Illustrations, including 17 Plates. **9s.** net; postage 5d.

STERILITY IN WOMEN: Diagnosis and Treatment.

By **SIDNEY FORSDIKE,** M.D., B.S. Lond., F.R.C.S. Eng. and Edin., Surgeon to the Hospital for Women, Soho Square, London, etc; Author of "The Effects of Radium upon Living Tissues," etc.

"The monograph shows in every page evidence of rich personal experience, and will well repay the most careful study."—THE LANCET.

Telegrams: "Publicavit, Estroad, London." *** *Complete Catalogue post free on application.* *Telephone: Museum 7756.*

LONDON: H. K. LEWIS & CO. LTD., 136, GOWER STREET and 24, GOWER PLACE, W.C. 1.

Atophan

TRADE MARK

The Outstanding Remedy in Acute and Chronic
MUSCULAR AND ARTICULAR RHEUMATISM, GOUT, ARTHRITIS, SCIATICA, NEURALGIA, LUMBAGO.

Powder, Tablets (gr. 7½), **Dragées** (gr. 1½).

Dose :—2–4 Tablets daily for 3–4 days, then an interval of 3–7 days.

'ATOPHANYL'

('Atophan' Sodium and Sodium Salicylate).

FOR PARENTERAL ADMINISTRATION.

Of pronounced value in Acute RHEUMATISM, ARTHRITIS DEFORMANS, and various Neuralgic Conditions.

Presents the remedial properties of both components in an intensified form.

Ampoules for Intravenous and Intramuscular Injection.

Clinical samples and literature on request from

SCHERING LIMITED, 3, Lloyd's Avenue, London, E.C.3.

Or from the following Overseas Depôts :

CANADA— Schering (Canada) Ltd., P.O.B. 358, Montreal.
CEYLON— General Trading Co., P.O.B. 316, Colombo.
BRITISH INDIA— Schering-Kahlbaum (India) Ltd., P.O.B. 2006, Calcutta.
AUSTRALIA— Willmott Prisk & Co., Ltd., Sydney.
NEW ZEALAND— F. & N. Suckling, Auckland.
STRAITS SETTLEMENTS & SIAM— Handelmaatschappij v/h Barmer Export Gesellschaft, Singapore and Bangkok.
DUTCH INDIES— H. V. v/h W. Biedermann & Co., Batavia, Handelmaatschappij v/h Barmer Export Gesellschaft, Medan.

FOR TOXÆMIAS OF INTESTINAL ORIGIN

Kaylene-ol

ACTIVELY PREVENTS THE ABSORPTION OF TOXINS.

KAYLENE LIMITED, 7, Mandeville Place, London, W.1. *Telephone :* Mayfair 1608. *Telegrams :* Kayloidol, Wesdo, London.

ZŌPLA HAS A CHARACTERISTIC GRIP WHICH PREVENTS SLIPPING

It causes no irritation.

Does not deteriorate in stock and is supplied on strong cloths suitable for surgeons. Various sizes.

Samples sent on request.

LESLIES LTD., High St., WALTHAMSTOW, LONDON, E.17

Well known as manufacturers of Holland Strapping.

THE LANCET

No. 5510. LONDON, SATURDAY, APRIL 6, 1929. CCXVI.

CONTENTS

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT.

LUMLEIAN LECTURES

entitled A Medical Review of the Surgery of the Chest. By R. A. YOUNG, F.R.C.P.—II. 697

ORIGINAL ARTICLES.

Phenyl-Cinchoninic Acid in the Treatment of Gout. By GEOFFREY EVANS, F.R.C.P., and A. W. SPENCE, M.R.C.P.—(*Illustrated*) 704

Salivary Calculi and their Treatment. By CECIL P. G. WAKELEY, F.R.C.S.—(*Illustrated*) .. 708

The Rôle of Hydrochloric Acid in the Causation of Gastric Pain. By T. L. HARDY, M.R.C.P. 711

A Control Observation with Sanocrysin. By B. R. CLARKE, M.D., and H. G. K. HADDICK, M.B. 714

CLINICAL AND LABORATORY NOTES.

Ulcerative Endocarditis of the Tricuspid Valve. By J. F. WILKINSON, M.B.—(*Illustrated*) 716

Leprous Lesions of the Scalp. By A. R. DAVISON, M.R.C.S.—(*Illustrated*) 717

MEDICAL SOCIETIES.

Royal Society of Medicine: Section of Medicine: Gastric Chemistry 718

Comparative Medicine and Neurology: Encephalomyelitis in Man and Animals 720

REVIEWS AND NOTICES OF BOOKS.

Four Centuries of Medical History in Canada, and a Sketch of the Medical History of Newfoundland. By John J. Heagerty, M.D., D.P.H. 721

Diseases of the Liver, Gall-bladder, and Bile-ducts. By Sir Humphry Rolleston, F.R.C.P., and J. W. McNee, F.R.C.P. 721

Die Chirurgie der Gelenke und Schleimbeutel. By Profs. E. Siefert, E. Stahnke, and F. König.. 722

The Frog. By the late A. Milnes Marshall. Edited by H. G. Newth 722

Contributions to the Principles of Morphology. By W. B. Crow 722

The Principles of Applied Zoology. By Prof. R. A. Wardle 722

Essai sur le pneumothorax artificiel bilateral et simultané. By Dr. Jean Terrasse 722

Practical Bacteriology. By Prof. Fred W. Tanner, Ph.D. 722

LEADING ARTICLES.

GASTRIC SECRETION 723

THE POWERS OF THE POLICE 724

ECONOMICS OF THE NURSE'S TRAINING 725

ANNOTATIONS.

The King 725

The Prevalence of Spinal Irregularities 725

Opium in Childhood 726

Fatigue and Exhaustion .. 726

Anoxæmia in Tuberculosis 727

The Infancy of Midwifery 727

Supersensitiveness to Insulin 728

Cancer and Tuberculosis .. 729

Gallop Rhythm 729

Pathology of Pyorrhœa Alveolaris 729

Occupational Silicosis 730

Blood Pressure and Disease 731

MODERN TECHNIQUE IN TREATMENT

The Treatment of Vulvar and Anal Eczema.—II. By AGNES SAVILL, M.R.C.P. 731

SPECIAL ARTICLES.

The Alleged Toxic Action of Accessory Food Factors. By J. CLIFFORD HOYLE, M.B., ... 734

Medicine and the Law: Acquittal on Charge of Criminal Abortion..... 736

United States of America: The Work of the Public Health Service: Annual Report of the Surgeon-General 737

Scotland: The Blind in Edinburgh 738

Ireland: Medical Certification of Insured Persons.. 739

PUBLIC HEALTH SERVICES.

Influenza 739

Infectious Disease in England and Wales 739

CORRESPONDENCE.

X Ray Examination after Injury (Dr. Horace Hill) 740

The Study of Industrial Hygiene (Prof. Major Greenwood) 740

The Employment of Bacteria in Modern Warfare (Profs. R. Pfeiffer and Carl Prausnitz) 741

Gamma Radiation (Mr. C. P. G. Wakeley and Dr. H. A. Colwell)..... 741

The Panel System in Big Towns 750

OBITUARY.

Alphonso Elkin Cumberbatch, F.R.C.S.—(*With Portrait*) 742

Joseph Roderick Sutherland, M.B., D.P.H. 742

Samuel Herbert Burton, F.R.C.S. 742

James McHugh, M.B. 743

THE SERVICES.

Royal Army Medical Corps.—Royal Air Force.—Indian Medical Service.. 741

PARLIAMENTARY INTELLIGENCE.

Notes on Current Topics: The Easter Recess.—Reconstituted Cream Bill 743

House of Lords: Local Government (Scotland) Bill 743

House of Commons: Deaths from Coal-gas Poisoning.—Milk for Public Health Purposes.—The London Lock Hospital.—Grant to British Social Hygiene Council 744

MEDICAL NEWS.

Society of Apothecaries .. 744

University of Aberdeen .. 744

University of Durham 745

Leeds General Infirmary .. 745

Donations and Bequests .. 745

Medical Women's International Association 720

A Country Home for Children 740

Work of the Voluntary Hospitals 740

Royal Society of Tropical Medicine and Hygiene.. 743

Food Education Society .. 745

Central Assoc. for Mental Welfare 745

Hospitals and Motor Accidents 745

NOTES, COMMENTS, AND ABSTRACTS.

Manipulation of the Back. By JAMES MENNELL, M.D. 746

Finger-prints 748

A Record of Phrenology .. 748

Mediæval Wills 749

The Melancholia of Semmelweis 749

Vitamin C in Liver 750

The Guardianship Society 750

The Public Schools Year Book 750

"Transpulmin" in Tuberculosis 750

Medical Diary 745

Appointments 745

Vacancies 745

Births, Marriages, Deaths 746

NEW CALCIUM THERAPY

Calcium-Sandoz

For oral, intramuscular or intravenous use

COMBINES INTENSE THERAPEUTIC ACTION WITH PERFECT TOLERANCE

AMPOULES — POWDER

SANDOZ CHEMICAL WORKS, 5, Wigmore Street, London, W.1

THE MUSEUM GALLERIES

Telephone : Gerrard 3932 (STUDIOS) *Telegrams : Museumgal*

53, SHORT'S GARDENS, DRURY LANE, LONDON, W.C. 2

The Dutch Art Exhibition

The passing of this magnificent exhibition will doubtless disappoint many thousands of art lovers who were unable to visit the Royal Academy, but consolation can in part be sought at the Studios of the Museum Galleries where a series of engravings after VERMEER, METSU, FRANS HALS, JAN STEEN, HONTHORST, &c., is in course of progress. The accompanying illustration is taken from the mezzotint by the well-known engraver Mr. Arthur Hogg, and impressions in colour are now being taken from the plate at their Studios to which your presence will be welcome. Mr. Hogg, it will be remembered, was the engraver of "LITTLE GIRL'S HEAD" by Vermeer which has won universal praise, and the subscription list for which is rapidly filling up.

"THE LETTER-WRITER SURPRISED." AFTER GABRIEL METSU.

Please write for full particulars of the above to be sent to you.

Lumleian Lectures

ENTITLED

A MEDICAL REVIEW OF THE SURGERY OF THE CHEST.

Delivered before the Royal College of Physicians of London

BY R. A. YOUNG, C.B.E., M.D., B.SC. LOND.,

FELLOW OF THE COLLEGE; SENIOR PHYSICIAN TO THE MIDDLESEX HOSPITAL; PHYSICIAN TO THE BROMPTON HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST.

LECTURE II.*

(Delivered on March 21st, 1929.)

THE surgeon and the bronchoscopist seem destined to take an increasing share in the treatment of severe pulmonary disease. This is more particularly to be expected in cases where medical measures are inapplicable, where they have failed, or where they require surgical aid to promote their actions.

Some of the most striking applications of surgery in this department of medicine have occurred in connexion with pulmonary tuberculosis, and it will therefore be convenient to deal with these first.

SURGERY IN PULMONARY TUBERCULOSIS.

The earlier applications of surgery in this disease were chiefly directed to the drainage of cavities and the removal of diseased areas of lung. To some of these I have referred in my first lecture. They were courageous attempts, but though successes were recorded, they did not lead to advances because they dealt with effects and failed to influence the primary disease and its spread. They were pioneer efforts, and the historical surveys given by Stephen Paget [1] and by Rickman Godlee [2] make interesting reading. A few chest surgeons are even now in certain cases advising drainage of some cavities which fail to close by collapse methods.

Modern surgical methods in this disease are the outcome of the combined experience obtained by surgeons in the treatment of chronic empyema and that of physicians in the use of artificial pneumothorax as a therapeutic measure. Although these have progressed practically concurrently, thoracoplasty in empyema antedated collapse treatment in tuberculosis. To Ludolph Brauer and Lucius Spengler belongs the credit of correlating the two methods. The history of collapse treatment has been admirably described by Clive Riviere,[3] Morriston Davies,[4] and Alexander.[5] Only a brief review is here necessary in order to point out the way in which the present practice has been developed. The untimely death of Clive Riviere is deeply to be deplored. In this country the application of combined medical and surgical treatment owes much to his clear and critical publications, his careful and considered application of these methods, and his wide experience of them. My own indebtedness to his writings will be apparent.

After Carson's original suggestion the idea lapsed, and its eventual realisation succeeded only after slow and gradual groping. Houghton, in 1832, noted the beneficial effects of spontaneous pneumothorax in an advanced case of phthisis. Stokes, in 1837, writes as if this were a well-recognised sequence. Toussaint, a pupil of Potain's, stressed, in 1880, the improvement after spontaneous pulmonary collapse. In 1884 Potain [6] himself replaced an effusion with sterilised air, the first gas replacement on record. He used a manometer to control the pressure, and in 1888 recorded two other cases in addition. Meanwhile, in 1882, Forlanini had suggested artificial pneumothorax as a form of treatment of pulmonary tuberculosis, though he seems to have waited until 1888 before actually trying it, and delayed publication of his results until 1894–95. Cayley's attempt to stop hæmoptysis by open pneumothorax took place in 1885. Forlanini and Potain seem therefore to be the first successful pioneers of practical artificial pneumothorax methods. J. B. Murphy [7] in 1895, independently applied this method of collapse treatment, and by 1901 his pupil, Lemke, was able to record 53 cases. Schell, of Indiana, in 1899, was the first after Cayley to apply the method deliberately to the treatment of hæmoptysis. A noteworthy advance was the addition of a water manometer to the apparatus by Saugman in 1904. The adoption of the method in Germany by Brauer was also to prove fruitful. He reported his cases in 1905–06. The credit of introducing the method into England is due to Colebrook, Lillingston, Pearson, and Rhodes in 1911. Although this country was late in the field, and the general adoption of this method as a routine treatment for selected cases was tardy, a great deal of useful work has been done and good results have been obtained. Dr. Clive Riviere's[8] book and the report to the Medical Research Council of Dr. Burrell [9] and Dr. MacNalty have both helped to this end in great measure.

The surgical attempts to induce collapse started even before the medical. Estlander,[10] in 1879, introduced his method of endeavouring to close chronic empyema cavities, and applied the name of thoracoplasty to it. Schede introduced the method of large lateral resections for the same purpose. The first actually to apply this principle to the tuberculous lung was de Cerenville,[11] of Lausanne, in 1885. He removed parts of the upper ribs in four cases with excavation, at the same time draining the cavity in two of them. He therefore slightly antedates the practical application of artificial pneumothorax, though not Potain's gas replacement. He was followed in this operation by Quincke, who, in 1896, advised its use in cases without excavation. Meanwhile Spengler applied the same method to cases with pleural effusion and applied the name of "extrapleural thoracoplasty." He employed a periscapular incision and his rib resections were more extensive. Garré and Quincke, in 1903 and 1905, suggested thoracoplasty, with or without pneumolysis, for hæmoptysis. It soon became apparent that the resections carried out by these surgeons were not extensive enough. To the physician, Brauer, is due the credit of recognising that if thoracoplasty were to be of value as a supplement to, or substitute for, artificial pneumothorax, it was necessary that sufficient lengths of the ribs should be removed to secure a degree of collapse approaching that obtained by it. The outcome of this was the Brauer-Friedrich operation, carried out by a large horseshoe-shaped incision similar to that of the Schede operation for empyema. This was first performed by Friedrich for Brauer [12] in 1907. Lengths varying from 10–25 cm. were removed from all the ribs from the second to the ninth. In later operations parts of the first rib and of the tenth were also removed. This extensive decostalisation proved dangerous from the shock involved, and disappointing in its effects, since "flutter" of both the mediastinum and of the chest wall sometimes resulted, the operation thus failing to keep the affected side at rest and impeding the effective ventilation of the sound side. Aspiration pneumonia frequently resulted, and there was a very high mortality. Alexander, to whose interesting account of the history I am much indebted, points out the remarkable experimental work done by Gourdet,[13] in 1895, after an operation performed by Boiffin for empyema in 1894. Gourdet demonstrated the much greater effects in diminishing the size of the hemithorax, of removal of parts of the ribs posteriorly, especially if the removal extended to the transverse process of the vertebræ. This mode of removal is generally referred to as paravertebral.

It was not until 1911 that the results of this important experimental work were applied to the problem of thoracoplasty. In that year Wilms [14] carried out

* Lecture I. appeared in THE LANCET of March 23rd, 1929.

an operation in which he removed sections of the first eight ribs by a paravertebral operation. This proved to be successful, though it was his intention to remove parts of the costal cartilages in front also, a procedure he carried out in later cases. This complete operation he called "pillar" or columnar resection. He sometimes removed the inner end of the clavicle. It was a modification of this operation which was first carried out by Morriston Davies in this country. In the same year Sauerbruch performed a paravertebral thoracoplasty in two stages. He seems to have recognised the importance of removing part of the first rib, and actually did so in 1909. This operation has now become the standard form in most countries, and his name is usually attached to it. Alexander, while recognising the great part played by Sauerbruch in establishing this operation as the most effective yet devised, refers to it as the Wilms-Sauerbruch operation, to recognise the part played by Wilms in the development. Brauer, who now carries out his own operations, has evolved a similar operation, which he calls "subscapular paravertebral thoracoplasty," in which he extends his resections of the ribs underlying the scapula further forward than Sauerbruch to try to secure more collapse.

It is now generally recognised that these thoracoplastic operations serve to give the benefits of pulmonary collapse to some patients in whom artificial pneumothorax is impossible owing to universal or widespread adhesions, or in whom it fails from the presence of adhesions of such extent as to render the collapse partial and ineffective.

The decision as to the use of these methods of collapse treatment, whether medical or surgical, involves a careful consideration of the following factors: the type, extent, and localisation of the disease, the clinical features of the case, the age, personality, social state, and general condition of the patient, as well as of his reaction to the ordinary methods of treatment. Theoretically, this method is ideal for unilateral cases, but it is well recognised that, pathologically, strictly unilateral lesions are rare, and therefore the greatest care has to be paid to the condition of the less involved or relatively sound lung. It is for this reason that thorough X ray investigation is so necessary in these cases, including screen examination.

Artificial pneumothorax is now so generally recognised as a routine treatment of certain cases that any detailed account of it is unnecessary here, the more so that its use is largely in the province of the physician, although it is in its essentials surgical in principle. Thoracoplasty is its major equivalent or rather substitute, since it should be remembered that the collapse induced by it is less than obtained by a complete pneumothorax. None the less, the results obtained by it in successful cases are of the same type, pathologically and clinically, as those of artificial pneumothorax, and it has been epigrammatically expressed by Claus:[15] "A good pneumothorax is better than a thoracoplasty, but a good thoracoplasty is better than a bad pneumothorax." It should not be forgotten, however, that the collapse produced by this operation is permanent, and the restriction or abrogation of the lung function irrevocable, whereas in most cases of pneumothorax treatment the lung can be allowed to re-expand at any time should extension of disease in the opposite side or other emergency render this necessary. A safe rule is therefore to consider for thoracoplasty all cases which are well suited for artificial pneumothorax, but in which that treatment is impossible or fails. In general, no patient should be submitted to thoracoplasty until an attempt at artificial pneumothorax has been made. I propose, therefore, to consider the indications and contra-indications for collapse treatment in general, premising that the criteria of selection for thoracoplasty must be much stricter, both from the point of view of the extent and type of the disease and that of the general condition of the patient.

Cases Suitable for Collapse Treatment.

1. There is general agreement that the type of case likely to benefit most is that in which there is more or less extensive disease of slowly progressive type and of chronic course, in which the signs are clinically unilateral and in which X rays show very little damage to the opposite lung. Cases with excavation often derive special advantage, owing to the emptying of the cavities and the approximation of their walls. Matson, Matson and Bisaillon[16] advise that cases with cavitation and copious expectoration should be submitted to artificial pneumothorax without delay, in order to prevent wider spread in the affected side by aspiration and to avoid extension of the disease to the opposite side, a view in which Landreth and Mortlock[17] concur. It should be considered in cases described by the late Dr. A. C. Inman as "resting afebrile—ambulant febrile"—i.e., cases in which any attempt to put the patient on to exercise produces febrile reaction from auto-inoculation of the lung.

For the cases in this group *thoracoplasty* should only be considered if there is definite evidence of some natural tendency towards arrest or, in other words, only if the processes of fibrosis and contraction predominate over those of caseation and softening. This is often expressed by the statement that it is suitable for the "productive" and not for the "exudative" types of the disease. I deprecate the use of these terms, since it exalts into types the effects of processes which are usually concurrent, though one or the other predominates. Cases with old cavities which fail to collapse with artificial pneumothorax may be very suitable, yet the excavation is an evidence of previous caseation and softening. It has been suggested that only those cases in which the trachea is displaced by traction from fibroid disease should be considered suitable. This is too narrow a limitation, although this displacement is present in many of the cases selected.

2. In hæmorrhagic cases there are two indications for artificial pneumothorax treatment: (1) as a deliberate treatment in cases of repeated hæmorrhage, (2) as an emergency measure in severe hæmoptysis endangering life, in which case the state of the other lung may prevent its continuation after the hæmoptysis has ceased. It is of interest in this connexion to note that it is claimed by some observers that the introduction of a comparatively small amount of air is often sufficient to arrest the hæmorrhage. It is noteworthy, in view of the difficulty in bilateral cases of being sure of the side from which the blood comes, that Begtrup Hansen states that a partial collapse on the wrong side may exert sufficient effect on the other side through the mediastinum to be effective in stopping the hæmorrhage. *Thoracoplasty* should only be considered in cases of severe recurrent hæmoptysis when artificial pneumothorax has failed or proved to be impracticable, and then only after a phrenic evulsion has been tried and has failed.

3. In cases where partial arrest has been achieved by ordinary medical methods, but where the patient is left with cough and expectoration, often containing tubercle bacilli, collapse methods are helpful. Such patients are usually not able to return to work, but may be enabled to do so after collapse of the lung. Here again the procedure of choice is artificial pneumothorax, but thoracoplasty may be of definite value in this group.

4. Cases with predominantly basic signs in whom phrenic evulsion has failed to secure arrest, particularly if bronchiectasis is also present, may also be considered.

5. It would seem reasonable to expect when spontaneous pneumothorax occurs in a case of active disease of localised character, that its continuation by artificial pneumothorax refills would be indicated, the more so that it was the improvement in such cases which drew attention to the value of pulmonary collapse. It is a paradox that in general these cases do not do so well as the ordinary cases of primary

artificial pneumothorax treatment. In a considerable proportion infection of the pleura, progressing on to tuberculous empyema, renders surgical methods necessary, particularly thoracoplasty.

6. There remain the theoretically unsuitable and doubtful cases, such as those slowly progressive with definite signs in the contralateral side, in whom the best time for the treatment has been missed and in whom a partial collapse is all that can be expected. The majority of attempts at artificial pneumothorax in such cases may be doomed to failure from adhesions, but in a small proportion sufficient diminution of activity is secured to enable the patient's own reparative process to improve, even though the artificial pneumothorax has to be stopped owing to increased signs on the opposite side. This, too, may become quiescent when it has not to bear the whole burden of respiration, and the patient may eventually recover.

In this category may be considered also the acute and subacute cases. A few enthusiasts have applied artificial pneumothorax treatment to cases of acute caseous or pneumonic tuberculosis, and successful cases are on record by Saugman, the Matsons, and others. In general its use in this type of lesions is to be deprecated. These patients are swamped by the disease, both by its rapid spread and by the overwhelming of the protective antituberculous mechanisms. In these circumstances the effects are likely to be harmful. On the other hand, in cases where the onset is acute and even pneumonic in type, if under strict rest, some evidence of protective and reparative reaction is forthcoming, then artificial pneumothorax treatment may be tried with a moderate prospect of success, and the chance is worth taking. This group is a fortiori unsuitable for thoracoplasty.

Contra-indications.

These may be due (1) to the character and extent of the disease, (2) to the general condition and temperament of the patient, or to the presence of other conditions not due to the tubercle bacillus. The chief contra-indications in the first group are : (*a*) extensive active disease in the opposite lung. It is usually said that if it involves more than one-third of its extent either clinically or by X ray examination this contra-indication is absolute, but it depends more upon the type of the lesions than upon their extent. Lesions of any degree near the hilum or in the lower lobe are an absolute contra-indication to thoracoplasty. (*b*) Severe tuberculous enteritis is generally an evidence of acute or advanced disease, and is a contra-indication, though not an absolute one, to artificial pneumothorax. Brauer, Spengler, and Forlanini as well as Gravesen have all seen improvement in such cases. (*c*) Laryngeal tuberculosis of miliary type is an absolute bar. On the other hand, StClair Thomson and Trail [18] have shown that in ordinary cases of laryngeal tuberculosis, collapse treatment exerts a beneficial influence. (*d*) Severe renal tuberculosis renders success unlikely. Unilateral affection of the kidney is not a bar to artificial pneumothorax, since it may allow the lung disease to quiet down sufficiently to permit of surgical treatment of the renal disease.

The second group of contra-indications is less well-defined, and its assessment is rather a matter of experience than of rule. (*a*) Patients with poor physique and marked dyspnœa with a greatly diminished vital capacity are unlikely to do well. (*b*) Cases with marked cardiovascular debility, with rapid pulse or low pressure, especially if there are any signs of œdema, are unsuitable. (*c*) Severe visceroptosis is a contra-indication in Dr. Burrell's opinion, with which I agree. (*d*) Cases with other diseases, notably chronic nephritis, asthma, and advanced emphysema, are generally unsuitable. Diabetes is no longer prohibitive to artificial pneumothorax since the use of insulin. (*e*) In patients over 60 the chances of success with artificial pneumothorax are comparatively small, but Riviere has used it in a patient of 74. For thoracoplasty the age restrictions are more definite. It is unlikely to succeed when the costal cartilages have become calcified and rigid. Few patients over 45 are therefore suitable, but each case should be judged on its merits after careful study of the X ray films. The lower age limit is usually given as 15, though this is not absolute. Various surgeons, including Jacobaeus and Key, have found the results less satisfactory under the age of 20 than at later ages. (*f*) Highly neurotic patients, and those with actual mental instability are unsuitable according to both Burrell and Lillingston.

Thoracoplasty.

Paravertebral thoracoplasty is now established as the standard surgical method of inducing pulmonary collapse. It gives the most practical effective reduction in the lung volume of any method yet introduced, without the defects of "flutter" of the chest wall, mediastinum, or diaphragm. There is comparatively little difference between the Sauerbruch and the Brauer forms of the operation, and the experienced surgeon adapts the amount of rib he removes to the special needs of the individual patient. Many details vary in the practice of different surgeons. All agree in the necessity of special care in regard to preparation of the patient in accordance with the general principles mentioned in my previous lecture. A most important preliminary is to induce the patient to make every effort immediately before the operation to clear his chest of expectoration as far as possible, by postural methods and cough. By most surgeons morphine or omnopon and atropine are given half to three-quarters of an hour before the anæsthesia is commenced. The general preference here is for gas and oxygen given with one of the special forms of apparatus such as the McKesson, and supplemented by local anæsthesia. Sauerbruch and Bull prefer ether. On the continent, local anæsthesia alone was at one time the general rule. There is, however, an increasing number of surgeons on the continent who are discarding local for general anæsthesia. Sauerbruch and others employ local anæsthesia if the total amount of sputum in 24 hours is more than 30 c.cm. Bull is of opinion that the special care given to anæsthetics in this country justifies our preference for general anæsthesia. If local anæsthesia is chosen, novocaine, or novocaine and adrenalin are first injected into the skin, then into the intercostal nerves. Some operators actually block these nerves by alcohol injection with the idea of lessening post-operative pain, but this does not appear to be necessary.

The number of stages in the operation also varies considerably. Sauerbruch employs two, or more if necessary. Bull prefers the two-stage operation, as also do Jacobaeus and Key. Gravesen [19] does the operation in one stage where possible, but advises that the decision should be an individual one, depending upon the patient and his condition during the operation. Mr. Tudor Edwards, who has operated upon the majority of my cases, invariably does the two-stage operation, a course with which I am in absolute accord. The condition of the patient during the operation should not be taken as a guide, since the post-operative reactions cannot be foreseen. The effects of the sudden complete cessation of function of one lung throw great strain upon the compensatory respiratory and circulatory mechanisms. There is also the greater risk of extension of the disease on the relatively sound side, and the increased difficulty of cough in a complete, compared with a partial, operation. There is, in addition, more opportunity for absorption of toxic products into the circulation in a one-stage operation. Alexander points out that the greater mortality recorded in such operations compared with the two-stage is the best commentary on the question. Naturally, to a highly sensitive patient a one-stage procedure sounds preferable, as it saves the anticipation of a second operation with the discomforts of the first so recent in memory. It is here that the advantage of the surgeon establishing a confidential understanding with his patient is so valuable. In my own experience I have never known

a patient decline the second stage, since, as a rule, the first one brings sufficient improvement to encourage greater hopes from the completed operation.

The amount of rib removed varies with each case, and it is in this matter the skilled thoracic surgeon develops a practical judgment enabling him to adapt the extent of removal to produce the optimum effect. The total length of the sections of ribs removed varies from 100–180 cm.—i.e., from 1–1½ yards. In the old Brauer-Friedrich operation as much as 200 cm. was removed, which is more than 2 yards. If the operation is carried out in two stages, it is usual to resect parts of the lower ribs from the eleventh or tenth to the sixth or fifth at the first stage. At the second stage the ribs dealt with are those from the fifth or fourth to the first. Radiographic investigation before and after the second stage clearly demonstrates how much the eventual degree of falling in of the whole chest wall depends upon removal of adequate amounts of the upper ribs. The first rib is, as it were, the peg upon which the others hang, and it must be divided. The amount removed need not be great, in view of the difficulty of access. Sauerbruch removes about 3 cm. (1¼ inch). Even less than this is sufficient—e.g., a wedge-shaped piece about 1·5 cm. on the inner margin and 2·5 cm. on the outer. In regard to the eleventh rib the practice differs. Sauerbruch usually removes a small sector of it. Brauer, on the other hand, leaves it, claiming that it gives some support to the diaphragm and therefore tends to prevent flutter of the diaphragm. In my opinion, it is not as a rule necessary to remove it, notably where a preliminary phrenic evulsion has been performed, and Brauer's opinion is justified. In the two-stage operation the second is carried out as soon as conditions will allow, preferably within two, and not later than three weeks, and certainly before any extensive regeneration of bone has occurred from the periosteum stripped from the areas of rib removed. It is almost universally agreed that in the two-stage operation it is wise to resect the lower ribs first, in order to avoid the risk of aspiration from the collapsed lobe into the lower. Archibald, however, prefers to do the upper resections first, and claims that the risks of aspiration are offset by the greater expulsive power left to the diaphragm between the two stages. I am not in favour of a partial upper thoracoplasty coincidently with keeping up an incomplete but partly effective pneumothorax treatment. Where the latter fails a complete two-stage thoracoplasty is safer and preferable. In the theatre, the side operated upon is strongly strapped over the dressing, but above the drainage-tube, which is inserted and left in for a few hours.

The post-operative treatment is of as great importance in regard to success as the operation itself, and no surgeon should carry out this operation unless he can provide skilled, sympathetic, and effective nursing. There are two immediate objectives to bear in mind—viz., to relieve pain by morphine, omnopon, or heroin, and at the same time to encourage the patient to expectorate in spite of the pain. A special nurse is essential, and she must urge the patient to cough at regular intervals, at the same time supporting the side operated upon. The chief risks are those of aspiration pneumonia, activation of disease on the "sound" side, and cardiovascular failure. After these immediate post-operative risks are past, it is important to encourage the patient to re-educate and strengthen the muscles of the shoulders and arm. This should be done even between the stages. It is important that some form of effective thoracic support be worn for at least six months after the operation. By this time sufficient rib regeneration has occurred to maintain the collapse of the chest wall.

Results.

Numerous statistics are now available. The immediate operative risk has now been reduced in expert hands from more than 10 to 5 per cent. or less. The post-operative risks of aspiration pneumonia, extension and activation of disease in the opposite side, and acute cardiovascular failure increase the toll of the operation to at least 10 per cent. The best idea of the eventual results is afforded by Alexander's [20] analysis of 1159 cases collected from the literature between 1918–25. Cures were claimed in 36·8 per cent., while a further 24·4 per cent. were described as improved. The remaining 38·7 per cent. became worse or died (14·1 per cent. directly or indirectly as a result of the operation). In assessing these figures, it should be remembered that the majority of these patients had severe or advanced lesions and a grave outlook. Individual personal experiences are liable to make a greater impression than masses of figures. A highly intelligent patient, whom I had observed for many months and in whom artificial pneumothorax had proved to be impracticable, was progressing unfavourably. He went to Switzerland and was submitted to a one-stage thoracoplasty under local anæsthesia, with complete success. His description of the operation and after-treatment is more dramatic than any description in the books, but his final statement is illuminating: "I would go through it all again under similar circumstances to get an equal result."

One remarkable feature about the operation is the comparatively slight deformity which results, owing to the clavicle holding up the shoulder girdle. There is slight flattening in the front of the chest, especially in its upper part. The shoulder may be slightly lower or higher than before and there is usually slight scoliosis, but when the patient is dressed practically no deformity can be recognised.

Other Surgical Aids to Collapse Treatment.

It is usually stated that artificial pneumothorax fails in from 30 to 40 per cent. of the cases in which it is attempted. The commonest cause is the presence of adhesions. These may be practically universal and thus prevent completely any attempt at this form of treatment, or they may be partial, but of such a degree as to prevent any useful amount of collapse. The influence of adhesions on the results obtained are well shown by Gravesen's statistics from Vejlefjord. He found that in cases in which complete pneumothorax was obtained, as many as 70·2 per cent. were able to return to work; while in those with localised adhesions only 33·3 per cent., in those with more extensive adhesions 11·1 per cent., and in those with complete adhesions 11·8 per cent. reached a working capacity.

Various methods have naturally been devised to permit increased collapse in cases with adhesions. Among these the most important are: (1) attempts to stretch the adhesions, (2) attempts to cut them (intrapleural pneumolysis), (3) extrapleural pneumolysis, (4) paralysis of one side of the diaphragm.

Stretching Adhesions.

By increasing the pressure cautiously in therapeutic pneumothorax it is possible to stretch and even to detach soft adhesions. This manœuvre is, however, not devoid of risks. Among these may be mentioned rupture of the lung, leading to pyopneumothorax with all its grave possibilities, mediastinal bulge or hernia, and interference with the "sound" side.

Cutting Adhesions (Intrapleural Pneumolysis).

It is obvious that if there is extensive pleural adhesion no cutting operation is practicable. On the other hand, where collapse is prevented by band or string-like adhesions, it is possible to divide them. Jacobaeus, in 1913, invented the thoracoscope, a simple tubular endoscope introduced into the pneumothorax cavity through a cannula under local anæsthesia. By this means the adhesions can be seen, and if they appear suitable for division, this is effected by a galvano-cautery introduced through a second cannula. This ingenious operation succeeds in a certain number of cases, but it requires great skill, and the number of cases in which it is practicable is relatively small. It is not entirely painless, and it is not free from risks, such as hæmorrhage and the

serious danger of cutting through a piece of lung drawn out into an adhesion, thus leading sometimes to pyopneumothorax. Simple pleural effusion and subcutaneous emphysema are also not infrequent complications, though less serious. In my opinion, this operation, ingenious as it is, has only a limited usefulness. Morriston Davies at one time cut adhesions by means of a tenotome introduced through an intercostal space, the section being controlled by X ray observation, but now uses Jacobaeus's method. The third method which has been suggested is by open thoracotomy—the operation being called open intrapleural pneumolysis. This is now rarely carried out, as it also involves the risks of effusion and empyema.

Extrapleural Pneumolysis.

In view of the ease with which the parietal pleura can be stripped from the chest wall, it is not surprising that this method has been proposed to permit further collapse. It was first attempted by Tuffier,[21] in 1891, as a preparation for resection of part of the lung. Schlange, in 1907, performed a similar operation and filled up the space between the chest wall and the apex with iodoform gauze. Tuffier, in 1910, used fat as a filling. Since that time various substances have been used to fill up the gap and exert pressure upon the lung. Among these may be mentioned grafts of fat, muscle, and breast. Paraffin has been used and sometimes with success.

Attempts have also been made to keep up an extrapleural closed pneumothorax. Although these operations are theoretically admirable, their results are usually disappointing. It is often difficult to get a living filling sufficiently large to accomplish the object desired. Non-living fillings like paraffin are liable to lead to inflammatory effusion and then to extrude. This operation is most often carried out at the apex, when it is called apicolysis.

Phrenic Evulsion or Exairesis.

The credit of introducing the principle of paralysing the phrenic nerve in order to allow the diaphragm to encroach on the thoracic space with a view to assisting collapse belongs to Stuertz,[22] who, in 1911, proposed and carried out this operation for tuberculosis and bronchiectasis. Sauerbruch at the same time carried out a similar operation independently. The results were found to be disappointing until, in 1922, Willy Felix [23] investigated the anatomy of this nerve in detail. It was then found that it was extremely variable. It is often duplicated in the neck, and occasionally arises in three separate trunks. It receives fibres from other nerves, including the nerve to the subclavius muscle, the hypoglossal, the spinal accessory, vagus, and sympathetic. Felix, at the suggestion of Thiersch, first carried out the operation of evulsion or exairesis. The nerve is exposed in the neck under local anæsthesia and divided. The distal end is slowly twisted round the forceps, and as much as possible is drawn out. Sometimes the nerve and its branches can be drawn out almost entire, at others only a short length can be secured. The amount removed varies from 3 to 15 or even 18 inches. Although it would appear that the diaphragmatic excursions are a minor factor in pulmonary ventilation, being responsible only for one-sixth to one-eighth of the vital capacity, paralysis of one side of the diaphragm allows of considerable ascent of that structure into the thorax.

This operation is proving to be of very real value in a variety of conditions. These are clearly tabulated in two excellent papers by Morriston Davies.[24] In some cases of active basal tuberculosis, it turns the scale in favour of arrest. In extensive unilateral disease it may exert a favourable influence. As an accessory to artificial pneumothorax it has a wide field of utility. It can supplement an incomplete pneumothorax and render it effective. It can be used to check the pleural effusions which so frequently occur in the course of pneumothorax treatment, and it may assist in increasing the period between refills. In cases where the lung fails to expand when artificial pneumothorax is terminated, it may help to close the space left, though thoracoplasty may be necessary to complete the obliteration. It may be a very valuable addition to thoracoplasty. Sauerbruch carries it out beforehand as a test of the capacity of the sound lung to stand the strain imposed by the major operation. It is my almost invariable practice to have this operation done before thoracoplasty since, in a few cases, it may render this unnecessary, and I like to give the patient this chance. It is often of use in alleviating distressing symptoms, such as vomiting after cough, hiccough, and the drag on the heart from marked displacement due to fibrosis. The risks of the operation are slight. Great care should be taken to identify the nerve, as on four recorded occasions the vagus has been cut instead, with fatal result in each case.

Obliterative Pneumothorax.

Another cause of failure in artificial pneumothorax is rapid spread of adhesion between the visceral and parietal pleura. Oleothorax, which will be described in connexion with pleural disease, promises to be of use in preventing this.

Abscess and Gangrene of the Lung.

Intrapulmonary suppuration results from such a variety of causes that it is not surprising that its causation and treatment are both the subject of considerable controversy. At the outset it is well to exclude bronchiectatic collections, although the two conditions are often associated, since abscess may lead to bronchiectasis and bronchiectasis may cause definite abscess formation. Theoretically, interlobar empyema has also to be distinguished from lung abscess, but the distinction is often only possible at operation.

The classification of cases of abscess and gangrene is also a difficult task. The two conditions can with difficulty be distinguished clinically, and are often associated together. In gangrene there is a larger degree of putrefactive necrosis and greater fœtor with a larger proportion of anaerobic organisms. Recent researches suggest that in many cases they are only degrees or varieties of the same infective process, and that the important factors determining the onset of gangrene are the increased virulence of the organisms or the diminished resistance of the individual. Pressure by growth or aneurysm on a large branch of the pulmonary artery may also determine the development of gangrene. A tentative working classification is: (1) Cases originating in the bronchi. These are chiefly due to aspiration of infected material, either in association with inhaled foreign body or during unconsciousness from anæsthesia or other causes. (2) Parenchymatous. These are often single and may follow pneumonia or other infective processes. This condition is referred to as a "pneumonitis" by some American authors. At the same time, it should be recognised that it is rare in pneumococcus pneumonia apart from secondary infection by pyogenic organisms. (3) Embolic. These are often multiple and may be associated with septicæmia or right-sided infective endocarditis, or with local septic conditions at a distance—e.g., otitis media, appendicitis, or infective thrombo-phlebitis.

The striking feature brought out by some American statistics is the frequency of pulmonary abscess after tonsillectomy, and its association with oral and nasal sepsis. In 105 cases studied by Lilienthal, pneumonia (including influenza) was given as the cause in 29, tonsillectomy in 21. Whittemore [25] found 61 per cent. of 86 cases of abscess preceded by operation on the upper respiratory tract. Wessler [26] states that 28 per cent. of all cases of lung suppuration examined in the X ray department of the Mount Sinai Hospital, New York, arose after operations on the mouth, tonsils, or pharynx. Frederick Moore says the pulmonary abscess occurs once in every 3000 tonsillectomies. There is considerable dispute as to

the causation of these cases of post-operative lung abscess, especially those occurring after tonsillectomy. The case for the embolic causation is well summarised by Schlueter and Weidlein,[27] while Myerson champions the aspiration explanation. The matter is a very important one from the point of view of prevention, since lung abscess after tonsillectomy is far more frequent than it should be, though evidently less common here than in America, and if, as seems likely, it is due in even a fair proportion of cases to aspiration of infective material under anæsthesia, more strict measures of prevention should be enjoined. In this connexion it is interesting to note that Myerson[28] found, by bronchoscopic examination immediately after tonsillectomy, that there were blood and mucus in the bronchial tubes in 155 out of 200 cases examined. Hedblom, Joannides, and Rosenthal[29] showed that aspiration abscesses are easily produced experimentally in animals, the important factor being abolition of the cough reflex.

In this connexion the recent work on broncho-pulmonary spirochætosis must be mentioned. It has been shown in many countries that in cases of pulmonary abscess and gangrene, anaerobic organisms are abundantly present, especially in cases with fœtor. In the gangrenous forms various treponemata have been found, notably *T. microdentium*, *T. macrodentium*, *Spirochæta vincentii*, and invariably fusiform bacilli. A useful review of this subject has been given by David T. Smith.[30] The importance in regard to treatment lies in the fact that many successful results have been recorded from the use of arsenical preparations such as arsphenamine, neo-arsphenamine, and sulpharsphenamine in these cases. (4) A third group comprises abscess from involvement of the lung owing to the spread of suppuration from adjacent disease, whether of the bronchi, mediastinum, abdominal organs, or vertebræ. In this connexion the frequency of intrathoracic malignant disease as a cause must be remembered. In Graham's series of 178 cases of lung abscess, 10 per cent. were due to malignant disease. These abscesses are often unusual in situation, and may be unsuspected till X ray demonstrates them. Within this group may be included also cases due to rupture of a dysenteric hepatic abscess, subphrenic abscess, and suppurating hydatid cyst. (5) Perforating chest wounds and injury to the lung from fractured rib may also cause lung abscesses.

It is important to determine the cause of pulmonary suppuration or gangrene after it has been diagnosed, since this may influence treatment. The American practice in cases due to aspiration is treatment in the first instance by bronchoscopic lavage, and it is claimed that many cases can be cured by this means. It certainly seems worth an extended trial in post-anæsthetic cases.

It is generally admitted now that in the acute stage of abscess formation, before it is localised and before it has become encapsulated, surgical interference is to be avoided. Premature operation in such cases is as much to be deprecated as in empyema, and may be harmful or even disastrous. The conditions are somewhat analogous. In empyema in the early stage the condition is a diffuse inflammation with pyothorax, in abscess the pulmonary suppuration is diffuse, and in both conditions operation is not safe until the inflammatory process is circumscribed, in the one case by adhesions, in the other by encapsulation. It is also undesirable in suspected lung abscess to use an exploring needle. It may lead to rupture, either into a bronchus or into the pleura, or to infection of the cellular tissues of the parietes.

Spontaneous cure occurs in a fair proportion of cases. This is given as 11 per cent. by Lord, 13 per cent. by Whittemore, 33 per cent. by Wessler, 50 per cent. by Miller and Lambert, and 59 per cent. by Lockwood. If rupture into a bronchus occurs, recovery may eventually result if the abscess drains well and if emptying is promoted by postural manœuvres and cough. It has been recommended that in cases of abscess, especially those deeply situated, collapse of the lung should be induced by artificial pneumothorax, and many successful cases are on record. Perkins and Burrell[31] in this country recorded some cases treated in this way. In two of them rupture into the pleura resulted, though in both recovery occurred. Even when this accident occurs spontaneously the outlook is not unfavourable if the area of pleura involved is localised by adhesions. This has been pointed out by Eggers,[32] who reported ten cases, all of which recovered. Whittemore also noticed that this occurred, and he believes that cases of so-called rupture of empyema into the lung are really cases of lung abscess in which rupture occurs first into the pleura and later into a bronchus. In any case, abscess of the lung is not infrequently complicated by a localised empyema. In my opinion, artificial pneumothorax is only suitable for deeply seated abscesses.

It is, however, in subacute and chronic abscess that some of the most striking results of surgery are to be seen, particularly in neglected abscesses. When the abscess becomes encapsulated, it may remain for months ruptured and perhaps emptying incompletely, at the same time causing great disturbance of health and often copious offensive sputum. In such cases X rays may give almost conclusive evidence, especially after lipiodol, since in abscess formation the lumen of the bronchus going to it may be obstructed by œdema or granulations and a blank area corresponding to the abscess can be seen, with lipiodol in bronchi around it but none entering it. In such a case the surgeon can usually drain the cavity readily by a one-stage pneumotomy if the pleura is adherent at the spot over the abscess exposed by the preliminary thoracotomy. If no adhesions exist, a two-stage operation is necessary. Pleural adhesions are induced by stitching the lung to the parietal pleura and inserting a gauze pack. Five or six days later the abscess can be opened and drained, provided adequate adhesions have formed. If the abscess is not very large or very chronic, and if effective drainage is established, it may slowly contract, the discharge becoming less and complete recovery resulting. A similar method of treatment may be necessary after spontaneous rupture into a bronchus, when effective drainage does not occur. On the other hand, if the abscess is large or if its walls are very thick, its contraction may be slow, and in the process of healing a considerable fibroid change may develop, leading to contraction. If adhesions are present, the chest wall may fall in and the diaphragm be drawn up. In spite of these adjustments, further contraction may occur and the adjacent bronchial walls may become dragged on, thus leading to dilatation. It is not as well recognised as it should be that neglected abscess may be a cause of bronchiectasis, and that this can be prevented, or if it occur and is recognised sufficiently early, that it may be cured by treatment. In such cases a phrenic evulsion may be all that is necessary after drainage, the ascent of the diaphragm relieving the drag on the bronchi. This has been repeatedly demonstrated by Mr. Tudor Edwards. In cases where this is not sufficient, an extrapleural thoracoplasty of limited extent may be necessary. Commonly after draining an abscess a bronchial fistula results, and where a large abscess has been drained a cavity may be left with very numerous bronchi opening into it, a condition to which the name of "lattice lung" has been applied by Sauerbruch. This is a most difficult condition to deal with, but Lebsche has carried out a successful plastic operation in such a case. Some American surgeons have treated some cases of intractable lung suppuration by lobectomy, but the mortality from this is very high, though Graham has had success with his cautery method of removal of the diseased lung tissue. Some of the cases so treated and included under the category of pulmonary suppuration are actually cases of bronchiectasis and should not be included.

The treatment of gangrene of the lung depends upon the cause. If it is due to actual vascular pressure or occlusion, operation should not be advised. If it can be proved to be fuso-spirochætal in origin, arsenical injections can be tried. In circumscribed gangrene surgical methods offer the only chance of success.

Tumours of the Lung.

Innocent tumours of the lung are rare, and for the most part they are pathological curiosities. It is only when they cause pressure on the bronchi or on the mediastinal structures that surgical treatment comes under consideration.

Primary malignant tumours of the lung most often commence in the bronchial mucous membrane, and are rarely recognised until they give rise to symptoms from bronchial obstruction or from mediastinal pressure owing to secondary glandular involvement. They are therefore but rarely amenable to surgical removal. There is, however, one form of malignant growth of the lung in which lobectomy is practicable, and in this type it has already given encouraging results. This is that in which the primary growth originates in the lung parenchyma at a distance from the hilum. Lobectomy in a lung which is free from septic infection is an operation with a low mortality, and there is now a definitely evolved technique for its performance. It is surprising how little shock may occur, and remarkable how quickly the parts of the lung left behind can expand to fill the cavity resulting from the excised lung area, unless this is very large, when phrenic evulsion and even partial thoracoplasty may be necessary.

Systematic routine early X ray and bronchoscopic examinations of cases of obscure chest disease, especially those with unexplained, irregular, or suspicious hæmoptysis, are desirable, since if a localised lung growth of this kind can be recognised at an early stage, the patient should be given the chance of an exploratory thoracotomy with a view to lobectomy, if practicable. The outlook in cases of growth of the lung is at present so gloomy that the least chance of improvement should be seized.

Surgery in Bronchial Conditions.

The chief conditions of the bronchi which may be aided by surgical methods are: (1) inhaled foreign bodies, (2) new growths, (3) bronchial fistula, (4) bronchiectasis.

Foreign Bodies.

This question was fully dealt with in the Lumleian Lectures for 1924 by Dr. Thomas McCrae.[33] The pioneer work in the bronchoscopic removal of foreign bodies by Chevalier Jackson has revolutionised the treatment for this accident, to the great advantage of the patients.

Bronchial New Growths.

The bronchoscope has also proved of great value in removing some forms of simple tumour arising in the main bronchi and their chief branches. An interesting paper by Myerson [34] gives a description of a case treated by this means with an analysis of cases recorded by others. Mr. Somerville Hastings [35] has pointed out that a few malignant tumours have been successfully removed through a bronchoscope, while others have been treated by radium introduced or applied by this means. The bronchoscope is proving of increasing value, both in diagnosis and treatment, and its value in both these respects should be more widely recognised in this country.

Bronchial Fistulæ.

These are usually the result of disease or injury of the lung, or of operative procedures used in their treatment. Many of them heal spontaneously, but for others some form of plastic surgery may be necessary. Under certain conditions, notably in bronchiectasis or chronic abscess, they may serve a useful purpose and be retained deliberately.

Bronchiectasis.

Many forms of surgical treatment have been suggested in this disease. Some have already been discarded, and the general results of surgical intervention can hardly be regarded as encouraging, though successes occur which justify operation in selected cases. The ætiology of the condition is so complex that the indications for surgical treatment are difficult to define. Cases which are obviously due to some removable or remediable condition of a bronchus or of the lung tissue in its neighbourhood, such as those described under abscess of the lung and those resulting from inhaled foreign body, are the most likely to benefit. These are often called chronic bronchiectatic abscesses.

Those in which the disease starts early in life are often slowly progressive. In early stages they may be assisted by surgery, but they must be treated before they extend to the opposite side. At present all bilateral cases are inoperable. In cases where there is progressive suppuration leading to destructive changes in the lung tissue around, surgery may be considered, but the risks must be very carefully weighed before a decision is made. The general condition of the patient must also be very thoroughly investigated. Medical measures may in such cases palliate and restore a tolerable state of comfort to the patient, but too often they fail. Bronchoscopic lavage is now proving a valuable adjunct to medical treatment, though it rarely leads to cure. Artificial pneumothorax naturally comes into consideration in unilateral cases. If an efficient collapse of the lower lobe can be obtained, this treatment is worth keeping up, but as a rule it has to be continued indefinitely, since the symptoms usually return when the lung is allowed to expand again. If all these measures fail and the condition of the patient warrants it, surgery may be considered, but only after careful lipiodol investigation. Time should be allowed after this to permit of the expectoration of most of the lipiodol before operation.

The chief surgical operations which have been suggested in the treatment of bronchiectasis are:

1. Draining the cavity by *pneumotomy* as in abscess. This is clearly only suitable where there is a single large cavity. The patient is generally left with a small bronchial fistula, which may eventually close or be closed, though it may be desirable to keep it open.

2. *Ligature* of the branch of the pulmonary artery to the affected lobe was tried in some cases since it leads to fibrosis. This has proved to be of little ultimate value, and is practically no longer employed.

3. *Phrenic evulsion* is worth a trial in basic cases. It helps in the expectoration of the sputum, and in some cases it may lessen or even stop the fœtor. It is also of great value as a preventive of bronchiectasis after abscess of the lung. There is reason to hope that its employment in cases of unresolved pneumonia and other causes of bronchiectasis may prove to be a valuable preventive measure, if the early dilatation is recognised and the operation promptly carried out.

4. *Thoracoplasty.* Rib resections of sufficient extent to cause collapse of the affected lobe or lobes are carried out, usually in stages. Hedblom carries out what he describes as a graded thoracoplasty. A number of successful cases have been recorded in this country, notably by my colleagues, Mr. J. E. H. Roberts [36] and Mr. A. Tudor Edwards.[37] It should be remembered that in many cases the lung tissue is more densely fibrous than in cases of pulmonary tuberculosis, and that the dilated bronchial tubes are not likely to empty and collapse like the vomicæ of that disease. In consequence, the results are on the whole less often satisfying than in tuberculosis, but many patients have been restored to comfort and working capacity.

5. *Lobectomy.* The considerations just mentioned have suggested to some surgeons that extirpation of the diseased area is the ideal operation in this disease. It has been extensively tried in America, but as the mortality has been about 50 per cent., it is obvious that it is not to be recommended lightly. Brunn [38] has recently published five cases without a death, which gives a hope that in the future improved technique may render this operation more generally available.

6. *Cautery lobectomy.* Graham [39] has reported success with a method by which the diseased area of lung is exposed by rib resection, and after adhesions are secured, if they are not already present, the diseased area of lung is destroyed by applications of the actual cautery, repeated at intervals till the whole is removed. The facts that there is a 20 per cent. mortality even from this operation, and that it is a revival of method used 30 years ago by Lenhartz and by Sauerbruch more recently, do not augur well for its general adoption.

Both Hedblom and Sauerbruch have referred to the applications of surgery to bronchiectasis as a thankless task. None the less, it is one in which both patients and physicians desire such assistance, and there is yet hope that it will be forthcoming in more ample measure than at present.

In my next lecture I propose to consider the applications of surgery to pleural and mediastinal conditions.

REFERENCES.

1. Paget, Stephen: Surgery of the Chest, Bristol, 1896.
2. Godlee, R. J.: THE LANCET, 1887, i., 457.
3. Riviere, Clive: The Pneumothorax and Surgical Treatment of Pulmonary Tuberculosis, 1927, London.
4. Davies, H. Morriston: Brit. Jour. of Surgery, 1925, xiii., 58.
5. Alexander, John: Surgery of Pulmonary Tuberculosis, 1925, London.
6. Potain: Bull. de l'Acad. de Méd., 1888, 3me. ser., xix., 537.
7. Murphy, J. B.: Jour. Amer. Med. Assoc., 1898, xxi., 151.
8. Riviere, Clive: Loc. cit.
9. Burrell, L. S. T., and MacNalty, A. S.: Med. Research Council Report Series, No. 67, London, 1922.
10. Estlander: Revue Mensuelle, 1879, iii., 157.
11. de Cerenville, E. B.: Rev. Méd. de la Suisse Rom., 1885, v., 441.
12. Brauer, L.: Beiträg. zur Klin. der Tub., 1909, xii., 49.
13. Gourdet, J.: Thoracoplastie Posterieure, Paris Institt. Internat. de Bibliogr. Med., 1895.
14. Wilms, M.: Münch. Med. Woch, 1911, lviii., 777.
15. Claus, F.: Centralblatt f. d. ges. Tub. Forsch., 1924, xxi., 433.
16. Matson, R. W., Matson, R. C., and Bisaillon, M.: Tubercle 1923–24, v., 325; Amer. Rev. of Tub., 1924, ix., 294, and 1925, x., 562.
17. Landreth, J. F., and Morlock, H. V.: Tubercle, 1928, x., 102.
18. Thomson, StClair, and Trail, R. R.: THE LANCET, 1927, i., 963.
19. Gravesen, J.: Surgical Treatment of Pulmonary and Pleural Tuberculosis, London, 1925.
20. Alexander, J.: Loc. cit.
21. Tuffier, Th.: Semaine Méd., 1891, p. 202.
22. Stuertz, E.: Deut. med. Woch., 1911, xxxvii., 241.
23. Felix, Willy: Deut. Zeit. f. Chir., clxxi., 283.
24. Davies, H. Morriston: Brit. Med. Jour., 1926, i., 815, and Tubercle, 1928, ix., 206.
25. Whittemore: Boston Med. and Surg. Jour., 1923, clxxxviii., 497.
26. Wessler: Jour. Amer. Med. Assoc., 1919, lxxiii., 1918.
27. Schlueter, S. A., and Weidlein, I. F., Arch. of Surg., 1927, xiv., 457.
28. Myerson, M. C.: Laryngoscope, 1922, xxxii., 929; ibid, 1924, xxxiv., 63.
29. Hedblom, C. A., Joannides, M., and Rosenthal, S.: Annals of Surg., 1928, lxxxviii., 823.
30. Smith, D. T.: Tubercle, 1928, ix., 420, and Amer. Rev. of Tub., 1927, xvi., 352.
31. Perkins, J. J., and Burrell, L. S. T.: THE LANCET, 1923, i., 478.
32. Eggers, C.: Arch. of Surg., 1926, xii., 338.
33. McCrae, Thomas: THE LANCET, 1924, i., 734.
34. Myerson, M. C.: Amer. Jour. Med. Sci., 1928, clxxvi., 720.
35. Hastings, S.: Proc. Roy. Soc. Med., 1926, xx., 27.
36. Roberts, J. E. H.: St. Bart.'s Hosp. Rep., 1928, lxi., 24.
37. Edwards, A. Tudor: Proc. Roy. Soc. Med., 1926–27, xx., 732.
38. Brunn: Arch. of Surg., 1929, xviii., 490.
39. Graham, E. A.: Jour. Amer. Med. Assoc., 1923, lxxxi., 1010; Arch. Surg., 1925, x., 392.

PHENYL-CINCHONINIC ACID (CINCHOPHEN) IN THE TREATMENT OF GOUT.

BY GEOFFREY EVANS, M.D. CAMB., F.R.C.P. LOND.,

ASSISTANT DIRECTOR OF THE MEDICAL PROFESSORIAL CLINIC, AND ASSISTANT PHYSICIAN TO ST. BARTHOLOMEW'S HOSPITAL;

AND

A. W. SPENCE, M.B. CAMB., M.R.C.P. LOND.,

DEMONSTRATOR IN PHYSIOLOGY AT THE HOSPITAL.

α-phenyl-cinchoninic acid was discovered by Döbner and Giesecke [1] in 1887. Martindale [2] gives its synonyms as phenyl-chinolincarbonic acid and cinchopen, and the drug is best known by its trade preparations phenoquin, atophan, and agotan. It has been shown that the action of atophan is accelerated and increased if combined with salicylic acid, and consequently atophanyl, a neutral solution of the sodium salt of atophan and salicylic acid, has been produced. Other combinations of atophan are icterosan, a 10 per cent. aqueous neutral solution of the sodium salt of atophan, and arcanol, which consists of equal parts of acetyl-salicylic acid and atophan. Atoquinol and biloptin, although derivatives of phenyl-chinolincarbonic acid, materially differ from it; atoquinol is allyl-phenyl-cinchonin ester, and biloptin is an iodised form of the substance.

This communication is concerned chiefly with the use of cinchophen, which we have prescribed in the form of phenoquin, atophan, or agotan. We have generally used the two former drugs, but in order to avoid comparison between them they will all be referred to as cinchophen, and it may be said at once that in our experience each of these preparations is of proved value in the treatment of gout, and has on occasion been responsible for severe toxic symptoms.

The Action of Cinchophen and its Compounds.

Cinchophen is absorbed from the intestine, but nothing definite is known of its quantitative absorption. The maximum limit of absorption of neocinchophen seems to be practically identical with the full therapeutic dose.[3] There is little known of the excretion of cinchophen. [4–7]

Its most important action is to increase the output of uric acid in the urine, and it simultaneously lowers the uric acid content of the blood. Thus, when cinchophen is given to normals in doses of 3–5 g. daily, there is an increased excretion of uric acid, which rarely continues beyond the first day; the output on the second day is usually normal or subnormal. When uric acid is injected intravenously into gouty patients, or food rich in purin is ingested, only a small percentage of the uric acid is excreted; but when cinchophen is given at the same time the uric acid output is increased in amount nearly equal to that of the excessive intake.[8] In gout, according to Pratt,[8] the increased output of uric acid persists for a long time after the administration of the drug is discontinued, but according to Graham [9] the increased uric acid output appears only for the first two or three days of the administration of the drug and then falls to normal.

It is a generally accepted hypothesis that its action is to increase renal permeability to uric acid, and there is some evidence (Graham) to show that it facilitates the transport of uric acid to the blood from the tissue fluids and sodium biurate deposits. Griesbach [10] suggests that cinchophen tends to check the storage of uric acid in the tissues, and according to Starkenstein [11] it may inhibit purin metabolism.

According to Brugsch and Horsters [12] cinchophen directly stimulates the bile-forming cells, and so causes an actual increased secretion of bile ("choleresis"). In patients with a biliary fistula an increased flow of bile up to 200 and even 300 per cent. was observed. Stransky [13] was unable to confirm these observations,

but Grunenberg and others [14 15] have reported an increase of bile in the duodenal contents as a result of the administration of cinchophen to healthy individuals and patients suffering from catarrhal jaundice. Further, Spurling and Hartmann [16] have observed that tolysin (the ethyl ester of para-methyl-phenyl-cinchoninic acid) increases the rate of excretion by the liver of halogen compounds of phenolphthalein, and also the rate of their elimination from the blood stream.

The Therapeutic Use of Cinchophen in Gout.

In 1908 Nicolaier and Dohrn,[17] while studying the uric acid excretion in gout, observed that the effect of the administration of cinchophen was to increase the excretion of uric acid in the urine from 100–300 per cent. Its use in the treatment of gout was introduced by Weintraud [18] in 1911, and since this date it had gradually come into general use. Early reports of its therapeutic value in gout were published by Weintraud [19] and others.[20–33] It has been used in rheumatic fever [3 27 34–37] and other forms of arthritis.[29 38 39] Feulgen [40] and others [9 19 41] have thought that tophi were reduced by it. More recently Llewellyn,[41] Graham,[9] and Thomson and Gordon [42] have added their testimony to its value in the treatment of gout. We ourselves are in agreement with the opinion expressed by Thomson and Gordon that the drug is more effective in subacute or chronic gout than during an acute attack.

Colchicum still holds its place in the treatment of acute gout, but there is no doubt of the value of cinchophen in chronic gout. By its persistent administration the pain and crippling effects of chronic gout are relieved, and the recurrence of acute attacks is prevented. In some patients who are literally crippled by the disease the regular administration of cinchophen so far restores mobility of the affected joints as to enable them after being bedridden for months to get up and walk again; and in addition to its beneficial effect on the local manifestations of the disease there is directly or indirectly a good effect on the general health and strength. The following cases illustrate the value of cinchophen in the treatment of chronic gout.

CASE 1.—A woodsman, aged 62, suffering from typical tophaceous gout in his fingers, elbows, wrists, and knees especially, was first diagnosed as suffering from gout by Sir Archibald Garrod in 1912. At this time he was suffering from recurrent acute attacks of arthritis, and subsequently to the diagnosis of gout being made he took colchicum regularly. For one period of nearly two years he took it three times daily almost continuously. At first colchicum controlled the disease satisfactorily, but after the war he became increasingly crippled and subacute attacks became increasingly frequent. From the beginning of January until June, 1924, he was practically bedridden. He was sleepless on account of pain, pale, feeble, and wasted. His friends and relations took a hopeless view not only of his return to work, but even of his recovery.

He was given cinchophen, 1 g. three times daily for three days in succession each week, and rapidly improved both in respect of his gout and his general condition. He was able to leave home in October, and returned to light work in December, 1924. He steadily improved during 1925, and was reasonably restored to health by the end of the year. During 1926 he was practically free from gout, but he continued taking cinchophen until July, 1927. He then stopped taking the drug, and he has kept perfectly well since; he can swing a 6 lb. axe, quarry, ditch, and fence without discomfort or fatigue.

He took 20 tablets each week at first, and continued to take 10 tablets each week for the first 12 months, and then gradually reduced the dose. When he got down to 10 tablets weekly he found it better to distribute the tablets through the week instead of taking them three days in succession, as originally advised. A threatened return of gout was prevented by one or two tablets taken at once. He took 600 g. of cinchophen in three years. No toxic symptoms of any kind occurred.

CASE 2.—A dressmaker, aged 42, was seen on Dec. 30th, 1921, with a 15 years' history of pains in the joints of the fingers and hands, accompanied by swelling and marked deformity. The disease had been regarded as one of rheumatoid arthritis. The joints most affected were the second and third metacarpophalangeal of both hands and the big toe-joints of the right foot. She was given tincture of iodine by mouth until Jan. 22nd, 1922, when the diagnosis of gout was made, and she was given cinchophen, 1 g. three times daily for two days in succession each week.

On Feb. 10th the cinchophen was increased to three days in each week; by the end of March there was a distinct improvement in the movements of both hands, and the deformity, which previously almost crippled her and prevented her working, began to diminish. Further improvement was noted in June, and by September she was practically free from pain. In October, 1926, the disease had been stationary for four years, and movements of the finger-joints were free, hindered only by some residual deformity which did not interfere with her work. The blood uric acid on this date was 2·8 mg. per cent., and a lævulose tolerance test showed slight impairment of hepatic function. In November the cinchophen was reduced to 1 g. three times daily for one day in each week, and in June, 1927, it was stopped.

In April, 1928, there was a return of arthritis with pain and swelling in the second and third metacarpophalangeal joints of both hands and in the interphalangeal joint of the right big toe. Cinchophen, 0·7 g. three times daily for four successive days in each week, was given with improvement, and in June this was changed to twice daily every day of the week, as the joints were always painful and stiff on the days she did not take cinchophen. Her condition has since been good.

In all, this patient has taken 1200 g. of cinchophen in seven years, and of this she took 927 g. in the first five and a half years. There have been no symptoms of poisoning.

CASE 3.—Female, aged 59, first complained of arthritis in October, 1922. It gradually progressed with exacerbations in July, 1923, and January, 1924. When seen in February, 1924, she was crippled, and had been unable to walk for nearly two years. The knee-joints were chiefly affected, also the hands (especially the second and third metacarpophalangeal joints), wrists, left shoulder, and ankles. The differential diagnosis between a non-specific infective arthritis and gout was not certain, but the diagnosis of gout was made on the general appearance and build of the patient, the presence of cardiovascular sclerosis, the character of the pain (particularly its intensity and paroxysmal incidence), the nature of the joints affected, and the appearance in radiograms of deposits of sodium biurate in the heads of several metacarpal bones.

Cinchophen, 0·7 g. increasing to 1·0 g. three times daily for three days in succession each week, was prescribed, and it had an immediate good effect. By June she could walk round her bedroom with two sticks, was free from pain, and in herself felt "totally different"; she was only "extremely weak in all joints." When seen again in August, 1926, she was greatly improved and able to walk two miles without other discomfort than some stiffness in both knees. She had taken 6 tablets of cinchophen daily and continuously, with the exception of only one week, since February, 1924—namely, 42 tablets per week for two and a half years! There had not been any toxic symptoms, and the patient was very well in herself. She was advised to reduce the drug to 10 tablets per week. In October, 1927, she wrote to say that she had reduced the dose to 18–28 tablets each week, but in the spring was compelled to return to "the old number, 6 each day, and picked up very quickly." She was again advised to reduce the dose to 10 tablets each week. In November, 1928, she had a relapse, and wrote to say that the arthritis had not responded to cinchophen this time. This is the only case we have had in which arthritis responded to cinchophen for a long period of time, and later in a relapse failed to respond to it again.

These three cases are given in some detail to illustrate the value of cinchophen in chronic gout of extreme severity, and as a record of the fact that some patients can take full doses for years with advantage. We have had a large number of patients who have taken cinchophen regularly for five and a half years and less with benefit, and Graham has reported the case of a man who has taken the drug for 16½ years.

We have not given case records of these patients because they are common experience, and the value of cinchophen in properly selected cases is too well known to require emphasis.

The Toxic Effects of Cinchophen.

The first cases of cinchophen poisoning were reported by Philips [43] in 1913; they were characterised by the appearance of purpuric, urticarial, or scarlatiniform eruptions, which subsided on discontinuing its administration. Similar cases have since been reported by Herrick [44] and others.[45–52] Schroeder [46]

in 1922 collected 17 cases of cinchophen poisoning, the most prominent symptoms being an urticarial eruption, with or without œdema, albuminuria, fever, headache, malaise, and gastric intestinal disturbances; in two cases there were also cardiac symptoms. He reported symptoms of poisoning even with small doses. Recently 20 cases of jaundice attributed to poisoning by cinchophen have been reported by Worster-Drought [47] and others.[53-62] Omitting one case of which clinical details are not available, and a second [53] attributed to atoquinol, 18 cases of jaundice following the administration of cinchophen have been reported, seven of which were fatal. In three cases the symptoms were those of icterus gravis, and at autopsy the livers showed acute yellow atrophy. From a study of the individual cases it is evident that the symptoms of poisoning occurred after therapeutic doses, except in three cases [57-59] in which considerable doses of cinchophen were taken over long periods without medical supervision; in one of Loewenthal's [62] cases the drug was taken in therapeutic doses, but without medical supervision. Schroeder,[46] however, in a study of the harmful secondary effects of cinchophen, has made no mention of the occurrence of jaundice.

Two fatal cases of acute yellow atrophy after the administration of biloptin have been recorded,[63 64] and four cases of jaundice which recovered.[63 65-67] Biloptin, however, being an iodised form of cinchophen, the consideration of these cases does not come within the scope of this paper.

Gastro-intestinal Tract.—Cinchophen, being an acid, causes local irritation and gastric distress in susceptible individuals, or when given in large doses. Hanzlik and others [36 68] observed toxic symptoms following its administration in very large doses. Absence of gastric distress after doses up to 7 g. daily of neocinchophen (tolysin) was reported by Barbour, Lozinsky, and Clements,[37] and by Chace, Myers, and Killian.[38]

In our experience, using therapeutic doses, symptoms of gastric irritation, varying from a sense of epigastric discomfort to acidity and heartburn, are the commonest expression of intolerance to cinchophen. These symptoms can be controlled in the majority of cases by giving water with the drug, and grs. 15 of sodium bicarbonate; though their presence requires very careful observation of the effect of the drug, it does not necessarily indicate its disuse.

A more marked condition of gastric irritation was seen in a woman aged 66 (Case 4), who suffers from tophaceous gout with recurrent acute attacks. On repeated occasions a single tablet (0·5 g.) has caused symptoms of gastric distress and severe malaise lasting three hours.

Such symptoms as these are likely to prevent anyone from continuing to take the drug, but there are others which are of greater importance, because they are a warning of a toxic effect on the liver and are more insidious in their onset.

Liver.—The first definite symptom of liver poisoning is a loss of appetite. Once its significance is realised there is no mistaking this symptom, for the patient who normally has a good appetite loses it, and develops a distaste for food which is a remarkable and unaccountable experience to him. This symptom was marked in one of our cases; if we had realised its importance immediately and had stopped the drug, the jaundice which subsequently developed could probably have been prevented.

Lethargy and somnolence precede the development of jaundice. Thus in one patient there was unaccountable sleepiness, and she was inclined to fall asleep at any time of the day that she sat down to rest. The symptom was recognised at once as a sign of liver poisoning and the drug was discontinued, but it was too late to prevent the subsequent development of jaundice. Jaundice has been observed in four cases, and it has developed very gradually; it may not appear until a week or two after discontinuing the drug. Associated with jaundice there is considerable malaise, which persists in gradually diminishing degree for a period of months after the jaundice has disappeared.

Three of these cases have already been briefly reported,[54] and the following note is of a more recent case.

CASE 5.—Brewer's drayman, aged 53, was admitted to St. Bartholomew's Hospital on July 15th, 1927, complaining of jaundice. For about 30 years he had suffered from pains in the joints of the feet, and one year before admission he began to have pains in the knees, hips, and hands. Two months before admission he came up to hospital, and the diagnosis of gout was made. He was treated as an out-patient with cinchophen, 0·5 g. three times daily for four successive days of each week. As a result of treatment his pains disappeared, and he was able to walk about unaided, which he could not do previously. Three weeks before admission he felt "out of sorts," and suffered from lassitude, anorexia with occasional vomiting, drowsiness during the day, and insomnia at night. A week later he was seen, and the administration of cinchophen was discontinued immediately. One week before admission jaundice began to appear.

Past History.—Except for his joint trouble he had been previously healthy. There was no history of syphilis. He drank about three pints of beer daily.

Condition on Admission.—The patient was a heavily built man, the skin and sclerotics deeply jaundiced. The temperature was normal. The tongue was furred, and there was considerable dental sepsis. There was a scaly papular rash over the chest and back. The heart and lungs were normal; the blood pressure 130 systolic, 90 diastolic; pulse 60. The liver was palpable about 1 inch below the right costal margin, but there was no tenderness and no ascites. The movements of the hips and ankles were appreciably limited, and there was ankylosis of the metatarsophalangeal joints of both great toes. The urine contained a trace of albumin and a large amount of bile-pigments. Hay's test for bile-salts was negative; red blood cells, 4,880,000; white cells, 15,600; and hæmoglobin, 84 per cent. The van den Bergh reaction direct was strongly positive, indirect 7 units of bilirubin. X ray examination of the stomach revealed nothing abnormal. The glucose-tolerance test was positive, the blood-sugar one hour after the administration of 50 g. of glucose by mouth being 185 mg. per 100 c.cm., and two hours after 170 mg. per 100 c.cm. The urinary diastatic index was 10 units. Blood uric acid 5·3 mg. per 100 c.cm. The Wassermann and Sigma reactions were negative.

Course.—During his stay in hospital the patient developed epigastric pain, which would come on practically every day and last for one or two hours; it was usually relieved by a carminative mixture. The stools were pale, but never clay-coloured. Two weeks after admission his condition improved, and his jaundice began to clear; on August 25th, 1927, he was discharged, the jaundice having almost disappeared, and his liver being barely palpable. Since then he has been under observation and has very gradually recovered his strength.

Kidneys.—Except for the appearance of a transient trace of albumin associated with other severer symptoms of poisoning, we have not observed any signs of renal damage. This agrees with the observations of Barbour, Lozinsky, and others.[3 37 38] Hanzlik and others,[36] however, found that cinchophen in the large doses given in the treatment of rheumatic fever (total dosage 4–19 g.) caused albuminuria and sometimes the appearance of casts and white blood cells in the urine of the majority of seven individuals that were observed. Similar findings were reported by Boots and Miller,[68] using neocinchophen.

Skin.—Skin rashes are referred to by other authors, and we have only observed a skin rash in one instance (Case 5).

Circulation.—According to Hanzlik [69] small therapeutic doses of cinchophen do not affect the circulation demonstrably except in susceptible individuals, who respond with some acceleration of the pulse and consciousness of the præcordium. Vasomotor depression after therapeutic doses has been observed independently by Barron [70] and Scully.[71]

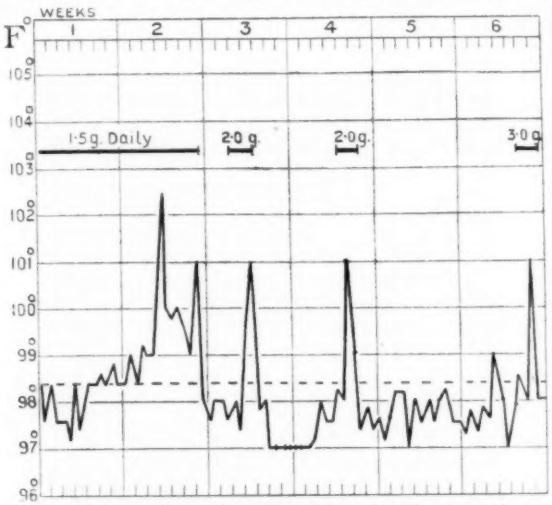
The following case is an example of cardiovascular disturbance due to cinchophen.

CASE 6.—A man, aged 62, was first seen on Nov. 6th, 1925, recovering from an acute attack of gout in his right foot. He was in good health apart from his gout; he had a clear complexion and a clean tongue; heart and lungs normal; B.P. 160/94; urine normal; there was a family history and past history of gout. Cinchophen with sodium bicarbonate was prescribed. He took cinchophen, 6 g. per week for a period, and then reduced the dose to 5 g.; he continued on this dose until September, 1928, when he was seen again on account of loss of weight (actual loss 9 lb.), dizziness, a feeling of his legs

giving way as he walked, and of occasional "frightful thumping" in the heart, radiating to the left side of the neck and left temple. His appetite and digestion were good; bowels natural, stools a little pale, and not quite formed; sleep good; no depression. Cinchophen was stopped and sodium bromide in an alkaline mixture was prescribed. Following this treatment his symptoms quickly subsided, and when seen again on Nov. 27th he felt well. Associated with this attack of cardiovascular disturbance attributable, in our opinion, to cinchophen, there was no change in his pulse-rate or diastolic pressure.

Metabolic Effects.—The following case illustrates a somewhat unusual type of cinchophen poisoning, and in this patient the administration of the drug was cautiously persevered with in spite of its toxic effects because of the very definite improvement in the arthritis which resulted from its administration.

CASE 7.—A nurse, aged 43, was admitted to St. Bartholomew's Hospital on Jan. 27th, 1927, complaining of pain and stiffness of both knees. Ten years previously she had had pain in the metacarpophalangeal joints of both hands, followed by pain and stiffness in both shoulders, elbow, and wrist-joints. Six years later she developed similar pain in



Temperature chart for six weeks in Case 7. The discontinuous line shows the periods during which cinchophen was administered, the daily dose being as stated.

the right knee and ankle, and one year before admission the left leg and both hips became similarly affected. She had been bedridden for 12 months.

Condition on Admission.—Her general condition was good and there was no clinical evidence of sepsis. There were tenderness and limitation of movement of the shoulder, elbow, wrist, knee- and ankle-joints. There was marked ulnar deviation of the fingers and slight spindle-shaped swelling of the proximal interphalangeal joints. The knee-joints were slightly swollen and fixed at an angle of about 120 degrees. The urine was normal. The blood uric acid was 4·0 mg. per cent. A test-meal showed a trace of free hydrochloric acid. An X ray examination of the affected joints showed absence of cartilage, new bone formation, and areas of bony rarefaction. The diagnosis of gout was made.

Course.—In addition to the application of massage, radiant heat, and extension to the legs, the patient was treated by the oral administration of 0·5 g. of cinchophen three times daily. On the ninth day after the initial dose the proximal interphalangeal and metacarpophalangeal joints of both hands became hot, swollen, and very painful, and on the following day the temperature rose to 102° F. (vide temperature chart attached); there was well-marked general malaise, but the joint pains became less severe. During the next two days the temperature fell gradually to 99°, but rose again the following day to 101°. She suffered from anorexia and nausea, and the cinchophen was discontinued (April 1st).

On April 4th 0·5 g. of cinchophen was given four times during the day, and on the following day the temperature rose to 101° F., but subsided on discontinuing the cinchophen. While taking cinchophen she suffered from nausea, malaise, and general pains. Again on the 13th 2·0 g. of cinchophen were given during the day, followed the next day by pyrexia, nausea, and malaise. On the 25th 1·0 g. of a different preparation of cinchophen was given three times during the day, and she again suffered from nausea, malaise, and a rise of evening temperature, which subsided on the following day, when the drug was discontinued. On May 3rd much smaller doses of cinchophen were given; on this date she received 0·06 g., on the 4th 0·2 g., on the 5th 0·1 g., and on the 6th 0·06 g. The pain in the joints on the 6th was severe. Cinchophen was then discontinued for three days. On the 8th she vomited on two occasions. On the 10th 0·06 g. cinchophen was given once daily for three days and discontinued for three; this was tolerated. On the 16th she received 0·1 g. daily for three days in the same way; on the 17th there was remission of pain, but on the 21st the pain in the left knee was severe, and she experienced a certain amount of nausea. She continued to take 0·1 g. cinchophen daily three successive days of the week, but during the whole of the time while taking it she suffered from nausea and pain in the joints. An attempt to increase the dose of cinchophen to 0·1 g. two or three times daily caused slight malaise, nausea, and a little more pain in the joints, but no fever. On June 22nd she was discharged from hospital with instructions to take 0·06 g. cinchophen twice daily.

The result of this persistent use of cinchophen was a gradual and steady improvement in the arthritis with a temporary setback on each occasion that poisoning symptoms occurred. The ultimate result, however, was very good, and the patient was able to walk out of hospital, though still considerably crippled. Local treatment by massage, radiant heat, and extension applied to both legs contributed to her recovery.

Since her discharge from hospital and after a period of time cinchophen was discontinued and colchicum given in its place. Progress has continued, and she is now able to walk up and down stairs and do a little housework, though her knee-joints are still very stiff.

Idiosyncrasy to Cinchophen.

Several of the cases reported in this communication (Cases 4, 5, and 7) are examples of idiosyncrasy to cinchophen. In one of these (Case 7) cinchophen in small quantities was responsible for an exacerbation of general and joint pains. We have seen this also in a man, aged 66, who has suffered from chronic gout for a number of years.

In his experience cinchophen brings on an attack of acute gout; this sequence of events has happened eight times and is associated with gastric and intestinal disturbance. The patient himself has tried the drug perseveringly, because a single tablet relieves him to some extent of "rheumatic" pains in the thighs. He has tried taking one tablet on alternate days, and also at longer intervals, and has discovered that his maximum tolerance of the drug is one tablet (0·5 g.) taken once a week. His statement of the present position is that he always keeps it by him, and takes one tablet now and then, but he is nervous about using it, because he would rather have chronic pains than an attack of gout.

A familial idiosyncrasy to the drug is suggested by the fact that this man's sister developed jaundice after taking cinchophen.

Two of the cases already reported [54] as having developed jaundice after taking cinchophen are further examples of an idiosyncrasy to the drug; in the one case the symptoms developed after taking only 30 tablets, not more than 10 being taken in one week; in the other there was an idiosyncrasy to two different preparations, and vomiting, followed later by jaundice, occurred after taking only one or at most two 0·5 g. tablets.

Discussion.

The most important toxic effect of cinchophen is on the liver, because when the liver is damaged by cinchophen it is responsible for a severe illness from which recovery is slow. Further, in fatal cases of cinchophen poisoning, death is due to its effect on the liver and to the acute yellow atrophy that results. Yet in spite of the published cases of liver poisoning due to cinchophen Brugsch[72] maintains that there is no question of atophan being a liver poison when given in the usual doses, unless the patient has been on a carbohydrate poor diet and as a result has poor glycogen reserves in the liver. He is indeed so sure of the innocence of atophan as a liver poison that he uses it for the treatment of jaundice in subacute yellow atrophy of the liver, and also in cases in which jaundice is due to a catarrhal cholangitis with blocking of the papilla by a plug of mucus or by congestion of

the duct. Weil [73] takes the matter further, and reviews the published cases of liver injury following the administration of atophan; he concludes "that only in the case of England and Holland, and in regard to quite individual cases, are there reports of injury to the liver following on continued use of atophan, while in Germany nothing is known about injury to the liver as a result of the continued administration of atophan." He goes on to say that "the few cases reported from England and Holland of liver disease following on the continued use of atophan are isolated and only have slight scientific foundation."

In view of the cases which we have placed on record in this communication, in some of which atophan was used, and in view of the experience of others recorded in writing, and to which we have given references, the opinions expressed by Brugsch and Weil need modification; and with regard to Weil's statement that nothing is known in Germany about injury to the liver as a result of continued administration of atophan, we feel bound to observe that it was known to the Schering Laboratory in 1924 that patients treated with atophan may "in very rare cases" react pathologically and develop "severe disturbances such as sickness and diarrhœa, *jaundice* and collapse" (the italics are ours).

Conclusions.

There can be no doubt that in cinchophen we have a drug which is often invaluable in the treatment of chronic gout, and in certain cases of this disease a cure can be effected, or great alleviation of symptoms obtained, such as cannot be effected by colchicum or any other means. Toxic symptoms of any severity rarely occur, and by a knowledge of the proper use of the drug we feel that even these can be avoided. At the same time it must be clearly recognised that toxic symptoms due to cinchophen do sometimes occur, and after relatively small doses, in those who have an idiosyncrasy to the drug.

Certain precautions should always be taken in prescribing cinchophen. A small initial dose should be given to test the patient's tolerance of the drug. It is given with water after meals, and if there is any symptom of gastric irritation, it is given with grs. 15 of sodium bicarbonate (cinchophen and sodium bicarbonate cannot be prescribed in the same mixture). It is generally best given, as Graham [9] has advised, on three days in succession each week, but there are occasions in our experience (as in Case 1) in which a smaller dose of cinchophen is more efficient and is well tolerated when distributed throughout the week; that some patients can take the drug continuously is proved by Case 3 in this series. When nutrition is poor and there is a suspicion of poor glycogen reserves in the liver, an ample carbohydrate diet should be given. Finally, any person taking cinchophen must be under medical supervision, and with the appearance of symptoms of liver poisoning, of which we believe a loss of appetite to be the first, the drug should be stopped at once. Case 6 is an example of the fact that toxic symptoms may arise in a patient who has already proved tolerant of the drug for a long time.

References.

1. Döbner, O., and Giesecke, M.: Ann. d. Chem., 1887, ccxlii., 290.
2. Martindale W. H., and Westcott, W. W.: Extra Pharmacopœia, London, 1918, i., 317.
3. Barbour, H. G., and Lozinsky, E.: Jour. Lab. Clin. Med., 1923, viii., 217.
4. Dohrn, M.: Zeit. f. Klin. Med., 1912, lxxiv., 445; Biochem. Zeit., 1912, xliii., 240.
5. Skorczewski, W., and Sohn, J.: Bull. Intern. Acad. Sci. de Cracovie., 1912, p. 885.
6. Greinert, E.: Arch. Exp. Path. Pharm., 1914, lxxvii., 458.
7. Scheunemann, B.: Arch. Exp. Path. Pharm., 1923, c., 51.
8. Pratt, J. H.: Atophan Therapy, in Endocrinology and Metabolism, New York, 1922, p. 411.
9. Graham, G.: Proc. Roy. Soc. Med., 1926, xx., 257.
10. Griesbach, W., and Samson, G.: Biochem. Zeit., 1919, xciv., 277.
11. Starkenstein, E.: Quoted from Pratt (Ref. 8).
12. Brugsch, T., and Horsters, H.: Zeit. f. d. Ges. Exp. Med., 1924, xliii., 517.
13. Stransky, E.: Biochem. Zeit., 1925, clv., 256.
14. Grunenberg, K., and Ullmann, H.: Med. Klin., 1924, xx., 663.
15. Taschenberg, E. W., and Hofmann, D.: Deut. Med. Woch., 1925, li., 1611.
16. Spurling, R. G., and Hartmann, E. E.: Jour. Lab. Clin. Med., 1928, xiii., 854.
17. Nicolaier, A., and Dohrn, M.: Deut. Arch. f. Klin. Med., 1908, xciii., 331.
18. Weintraud, W.: Therap. d. Gegenw., 1911, lii., 97.
19. Same author: Therap. Monatsch., 1912, xxvi., 21.
20. Deutsch, F.: Münch. Med. Woch., 1911, lviii., 2652.
21. Georgiewsky, K.: Deut. Med. Woch., 1911, xxxvii., 1030.
22. Zuelzer, G.: Berl. Klin. Woch., 1911, xlviii., 2101.
23. Meidner, S.: Therap. d. Gegenw., 1912, liii., 164.
24. Retzlaff: Deut. Med. Woch., 1912, xxxviii., 404; Zeit. f. Exp. Path. Therap., 1913, xii., 307.
25. Friedberg: Fortschr. d. Med., 1913, xxxi., 318.
26. Woodwark, A. S.: St. Bart.'s Hosp. Jour., 1912, xix., 216.
27. Kahlo, G. L.: Therap. Gaz., 1912, xxviii., 842.
28. McClure, C. W.: Med. Clin. N. Amer., 1920, iii., 957.
29. Chace, A. F., and Fine, M. S.: Jour. Amer. Med. Assoc., 1914, lxiii., 945.
30. Chace: New York State Jour. Med., 1916, xvi., 537.
31. Smith, C. A., and Hawk, P. B.: Arch. Int. Med., 1915, xv., 181.
32. Heller, E.: Berl. Klin. Woch., 1911, xlvii., 526.
33. Bendix, H.: Therap. d. Gegenw., 1912, liii., 301.
34. Klemperer, G.: Ibid., 1913, liv., 257.
35. Hanzlik, P. J.: Rev. Med., 1926, v., 306.
36. Hanzlik, Scott, R. W., Weidenthal, C. M., and Fettermann, J.: Jour. Amer. Med. Assoc., 1921, lxxvi., 1728.
37. Barbour, H. G., Lozinsky, E., and Clements, C.: Amer. Jour. Med. Sci., 1923, clxv., 708.
38. Chace, Myers, V. C., and Killian, J. A.: Jour. Amer. Med. Assoc., 1921, lxxvii., 1230.
39. Jokl, R. H.: Prag. Med. Woch., 1913, xxxviii., 465.
40. Feulgen: Centr. d. Bioch. u. Bioph., 1912, xiii., 818.
41. Llewellyn, L. J.: Gout, London, 1920, pp. 380, 403.
42. Thomson, F. G., and Gordon, R. G.: Chronic Rheumatic Diseases: Their Diagnosis and Treatment, London, 1926.
43. Philips, J.: Jour. Amer. Med. Assoc., 1913, lxi., 1040.
44. Herrick, W. W.: Ibid., 1913, lxi., 1376.
45. Marañon, G.: Ibid., 1914, lxiii., 2254 (Abst.).
46. Schroeder, K.: Ugesk. f. Laeger, 1922, lxxxiv., 1141; also Epit. Curr. Med. Lit., Brit. Med. Jour., 1923, i., 2.
47. Worster-Drought, C.: Brit. Med. Jour., 1923, i., 148.
48. Brammer, M.: Ugesk. f. Laeger, 1915, lxxvii., 1065.
49. de Oyarzabal, E.: Rev. Espan. de Dermat. y. Sif., 1913, xv., 301.
50. Huber-Pestalozzi, G.: Cor.-Bl. f. schweiz. Aerzte, 1915, xlv., 624.
51. Kissmeyer, A.: Ugesk. f. Laeger, 1915, lxxvii., 792.
52. Thomsen, H.: Ibid., 1915, lxxvii., 894.
53. Langdon Brown, W.: Brit. Med. Jour., 1926, ii., 37.
54. Evans, Geoffrey: Ibid., 1926, ii., 93.
55. Glover, L. G.: Ibid., 1926, ii., 136.
56. Willcox, W. H.: Ibid., 1926, ii., 273.
57. Wells, C. J. L.: Ibid., 1926, ii., 759.
58. Rake, G. W.: Guy's Hosp. Rep., 1927, lxxvii., 229.
59. Sutton, Don C.: Jour. Amer. Med. Assoc., 1928, xci., 310.
60. Klinkert, D.: Therap. d. Gegenw., 1926, lxvii., 334; 1928, lxix., 140.
61. Rabinowitz, M.: Med. Clin. N. Amer., 1928, xi., 1025.
62. Loewenthal, L. J. A., Mackay, W. A., and Lowe, E. C.: Brit. Med. Jour., 1928, i., 592.
63. Hitzenberger, K.: Wien. Klin. Woch., 1927, xl., 205.
64. Kingreen, O.: Deut. Med. Woch., 1927, lxiii., 971.
65. Schwarz, G.: Wien. Klin. Woch., 1927, xl., 238.
66. Singer, S.: Ibid., 1927, xl., 238.
67. Haudek, M.: Ibid., 1927, xl., 239.
68. Boots, R. H., and Miller, C. P.: Jour. Amer. Med. Assoc., 1924, lxxxii., 1028.
69. Hanzlik: Medicine, 1926, v., 197.
70. Barron, M.: Jour. Amer. Med. Assoc., 1924, lxxxii., 2010.
71. Scully, F. J.: Ibid., 1924, lxxxii., 623.
72. Brugsch, T.: Therap. d. Gegenw., 1928, i., 14.
73. Weil, P.: Med. Welt., 1928, vii., 257.

THE FORMATION OF SALIVARY CALCULI AND THEIR TREATMENT.

By CECIL P. G. WAKELEY, F.R.C.S. Eng., F.R.S. Edin.,

ASSISTANT SURGEON AND LECTURER IN SURGERY, KING'S COLLEGE HOSPITAL; ASSISTANT SURGEON, BELGRAVE HOSPITAL FOR CHILDREN.

Calculi in the salivary glands are most frequently found between the ages of 20 and 40. Men are affected to a greater extent than women in the proportion of three to one. The size of the calculi varies greatly; they may be as small as grains of sand or as large as a bantam's egg. Thorowgood demonstrated a specimen before the Pathological Society of London which measured 1⅛ in. in length and 2 in. in circumference. More commonly they vary from the size of a split pea to that of a date-stone. They are usually single and in a small percentage of cases only does recurrence take place after removal. As a rule, calculi in the glandular tissue are spherical or oval, while those in the ducts are elongated and resemble date-stones.

In the ducts they may be multiple and are then usually arranged end to end, the opposed surfaces being faceted. The surface of the calculus may be finely or coarsely granular and is usually of a dirty yellowish-grey colour. The structure varies considerably. In a fair proportion of cases a foreign body has been found as a nucleus. Some calculi are laminated, but in my experience this is rare. By far the majority of stones from the salivary glands and ducts are composed of calcium phosphate and calcium carbonate. A complete analysis of my last 12 cases of submaxillary calculi gives the following composition:—

Calcium carbonate	75·3 per cent.
,, phosphate	10·1 ,,
Soluble salts	6·2 ,,
Organic matter	6·1 ,,
Water	2·3 ,,

Ætiology.

The cause of calculus formation in the salivary glands and ducts has been, and still is, the subject of much discussion. That some constitutional condition

FIG. 1.

Multiple faceted calculi removed from the submaxillary gland (natural size).

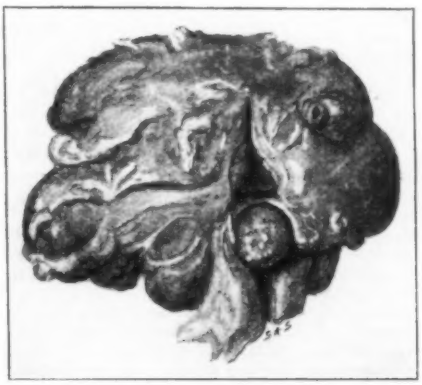
may predispose to calculus formation seems very improbable. If a general cause was in any way responsible one would expect it to exert its influence upon more than one gland, and to give rise to calculi in several glands or ducts. As a result of carefully examining the very extensive literature on the subject I have been able to discover three cases only in which calculi have been found in more than one gland or duct in the same person. When foreign bodies form the nucleus no doubt they are the initial cause in the formation, as stones in the urinary bladder form round an unabsorbed catgut ligature. Foreign bodies, however, must not be regarded as the sole cause, nor must it be thought that any foreign body introduced into a salivary gland or its duct will of necessity cause the formation of a calculus. The literature abounds with cases in which a foreign body such as a piece of straw, grass, or hair has been lodged in the salivary ducts for long periods of time without giving rise to any calculus formation. Roberg, who investigated 47 cases of salivary calculi between the years 1896 and 1904, is of the opinion that foreign bodies are frequently present in the ducts of the salivary glands without the production of calculi.

An analysis of the recorded cases of salivary calculi published up to the present time brings out the following figures:—

Submaxillary gland and duct	63·2 per cent.
Parotid gland and duct	20·6 ,,
Sublingual gland and ducts	16·2 ,,

It is necessary, therefore, to explain the far greater frequency of calculi in the submaxillary gland and Wharton's duct than in the other salivary glands and their ducts. It must be conceded that, owing to the greater size of the duct and the position of its orifice, foreign bodies such as tartar and particles of food can enter Wharton's duct more easily than they can

FIG. 2.



Calculus in submaxillary gland (natural size). The gland substance is very much fibrosed and thickened around the calculus.

the ducts of the other salivary glands. The composition of tartar is very similar to that of calculi. Therefore, although tartar may quite often be a determining factor, it would be quite impossible to demonstrate it. Similarly, food particles may enter the duct, undergo decomposition there, and simply add to the percentage of organic matter in the calculus without other evidence of their presence.

If a salivary calculus is carefully cut through its centre and a culture is made from the interior, bacteria

FIG. 3.

Calculus removed from submaxillary gland (one-third larger than natural size).

FIG. 4.

Comma calculus removed from the submaxillary gland and its duct (one-third larger than natural size).

are nearly always found. It might be thought that bacteria were the actual cause of the calculus, but this certainly cannot be the case, since, if infection alone were the important factor, calculi would occur more frequently in the gland and duct which are most often the seat of infection—namely, the parotid and its duct. Bacteria probably do play a part in the formation of calculi by decomposing the proteids in the saliva. It is a well-known fact that if saliva is exposed to the air for a short period of time carbon dioxide escapes

from it and a thin film of calcium carbonate soon forms on the surface. Therefore the removal of carbon dioxide alone is sufficient to precipitate the calcium salts. When bacteria decompose the proteids in saliva ammonia is produced, and probably immediately unites with the carbon dioxide held in solution; thus a condition favourable for calculus formation occurs. If this be so, it is quite reasonable to conclude that bacteria cause, indirectly, a precipitation of the calcium salts of the saliva by increasing the alkalinity of the saliva and removing carbon dioxide.

The composition of the saliva from the submaxillary gland allows easier precipitation of calcium salts than does that of the parotid or sublingual. The factors which predispose to a precipitation of the calcium salts in the submaxillary gland are: (1) high percentage of solids, (2) high percentage of organic matter, (3) greater degree of alkalinity, (4) low content of carbon dioxide.

It is sometimes debated whether the "idiopathic" formation of salivary calculi ever occurs. To me the question appears futile. If by the term "idiopathic" is meant that calculus formation occurs in a perfectly normal secretion in a perfectly normal gland or duct, the answer must clearly be in the negative. On the other hand, it does not seem necessary to postulate the entrance of any gross foreign material, since alterations in the reaction of a system of colloids and inorganic electrolytes are frequently accompanied by precipitation.

The lamination observed in the precipitation of certain salts in the presence of gels, and known as the Liesegang phenomenon, is profoundly influenced by the reaction of the gel. That variations in hydrogen-ion or hydroxyl-ion concentration in different media can be brought about by bacterial action is too well known to need comment. Hence the introduction of even a single micro-organism and its subsequent multiplication may set up such a disturbance in the equilibrium of an electrolyte-colloid system as to initiate precipitation. How far similar phenomena can be brought about by "filter-passers" is a question which time and experiment alone can solve. It is at any rate of theoretical interest, since these elusive entities are now considered to be important factors in the ætiology of influenzal and various catarrhal conditions. That colloids do play an important part in the formation of salivary calculi is at any rate suggested by their greater frequency in the submaxillary glands, where organic colloid material is present in the greatest abundance.

FIG. 5.

Calculus removed from Wharton's duct (one-third larger than natural size).

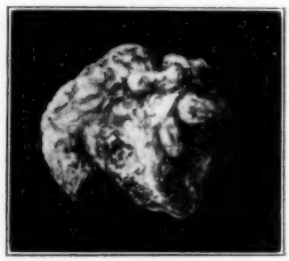
FIG. 7.

Calculus surrounding a small fish bone. It was removed from Wharton's duct (three times natural size).

Parotid Calculi.

Calculi are very rare in the parotid gland itself, Stenson's duct being much more frequently the seat of the formation. Multiple calculi are more common than single. Noehren, of Buffalo, reported a case in which 14 stones were removed from the parotid duct, and Townsend a case in which four stones were removed. Abscess formation around long-standing calculi is quite a common complication, and should the abscess open externally a fistula results. The masseteric portion of Stenson's duct is the most frequent situation for calculi, and their removal necessitates an external incision. Fistulæ may follow, but are rare if the incision is longitudinal and closed by stitches after the removal of the stones. If calculi be present in the premasseteric portion of the duct they may be liberated by an incision through the buccal mucous membrane.

FIG. 6.



Calculus removed from the orifice of Wharton's duct. It had been in this situation for over six months (one-third larger than natural size).

Submaxillary Calculi.

Calculi found in the submaxillary gland or its duct are usually single (Fig. 1). The single calculus may be seen in a variety of shapes according to the position in which it is lodged, either in the gland or in the duct. If it is in the gland it is usually rounded in appearance (Figs. 2 and 3), while if it is partly in the gland and partly in the duct it assumes a tapering form, the "comma calculus" (Fig. 4), the larger part of the calculus being in the gland while the smaller portion extends into the duct. This type is quite common, and the thinned distal portion is liable to be fractured and may then pass along the duct into the mouth, while the larger proximal portion remains in the gland. Such a calculus in the submaxillary gland cannot be palpated owing to the amount of fibrous tissue surrounding it, but it can nearly always be demonstrated by X rays. If, however, the calculus is in Wharton's duct it is usually moulded by the muscular wall and may be said to form a cast of the duct (Fig. 5). Lastly, if a calculus is formed at the orifice of Wharton's duct, or a small one passes along the duct and becomes impacted there, it is nearly always cylindrical (Fig. 6).

Many examples of calculi surrounding foreign bodies have been described. Perhaps one of the best examples of a specimen in the Royal College of Surgeons' Museum, No. 2234.1 (Fig. 7). It consists of a small fish bone which was found projecting from the orifice of Wharton's duct; it is encrusted with phosphates for more than half its length.

The treatment of submaxillary calculi is quite simple. Calculi in the gland usually necessitate excision of the gland, because there is always considerable fibrosis of the glandular alveoli due to the presence of the calculus and the back pressure exerted thereby. If the stone is in the duct an incision through the mucous membrane of the mouth into the duct is all that is required, and this can easily be performed under local anæsthesia. Calculi may re-form in either the gland or duct after an operation on the duct itself; oral sepsis plays a very important part in such cases. Stricture formation may follow ulceration of the wall of the duct, the ulceration being due either to the calculus or to the incision made in the duct. Incisions within the mouth cavity must always, even in the best circumstances, become infected owing to the innumerable bacteria which are invariably present.

History of a Case.

A man, aged 45, had suffered from chronic enlargement of the right submaxillary gland for three years. He came

under observation in 1922, and a calculus was found at the opening of Wharton's duct and was easily removed. A year later he returned to the hospital with a swollen submaxillary gland, and a calculus was felt in the duct of the gland. The mucous membrane of the floor of the mouth was incised under local anæsthesia and the calculus removed. An X ray photograph was taken in order to see if there were any calculi in the gland itself, but the result was negative. In 1926 he again presented himself at hospital with a very swollen submaxillary gland in which a large calculus could be palpated with a finger inside the mouth and the thumb outside. Excision of the submaxillary gland was then undertaken; three faceted calculi were found inside a very thickened and fibrosed gland, which was practically functionless as far as normal secretion was concerned.

One would expect that owing to their composition salivary calculi would be quite opaque to X rays. This proves to be usually the case, as Harrison, reporting upon 27 cases of salivary calculi in which operation was performed, obtained positive X ray findings in 81·4 per cent.

Calculus formation in the sublingual gland and its duct is a rarity, and very few cases are recorded. However, calculi are sometimes found in association with cystic distension of the gland. Burdel has reported a case of stone in the sublingual duct in an infant three weeks of age.

References.

Thorowgood, J. C.: Trans. Path. Soc. Lond., 1872, xxiii., 103.
Roberg, O. T.: Annals of Surg., 1904, xxxix., 669.
Nochren, A. H.: Jour. Amer. Med. Assoc., 1926, lxxx., 25.
Townsend, F. M.: U.S. Naval Med. Bull., 1926, xxiv., 909.
Harrison, G. R.: Surg., Gynec., and Obst., 1926, xliii., 431.
Burdel, L.: Compt. rend. Acad. Sci., Paris, 1860, l., 893.

THE RÔLE OF HYDROCHLORIC ACID IN THE CAUSATION OF GASTRIC PAIN.*

BY T. L. HARDY, M.D. CAMB., M.R.C.P. LOND.,
ASSISTANT PHYSICIAN, GENERAL HOSPITAL, BIRMINGHAM.

IT would seem almost a task of supererogation to revive discussion of an acid factor in the causation of gastric pain, in view of the apparently conclusive observations of Hurst [1] some 20 years ago, observations which have since received confirmation from many sources, clinical and experimental. Nevertheless it cannot be denied that there still exists in the minds of most laymen, and of not a few medical men, the belief that gastric pain must in some way be associated with gastric acidity, a belief which finds its expression in the occasional use of such terms as hyperchlorhydria and acid dyspepsia to denote clinical states illustrating cause and effect, and in the use of sodium bicarbonate or other alkali for their relief. But while the evidence, both clinical and experimental, is definitely opposed to such a view, recent work by Palmer [2] has renewed interest in the subject and certainly demands critical consideration. After confirming Hurst's observations that the mucous membrane of the stomach in healthy individuals was insensitive to concentrations of hydrochloric acid up to 0·5 per cent., he was able to reproduce in ulcer patients under suitable conditions of susceptibility their characteristic pain, not only with 0·5 per cent. hydrochloric acid, but also with concentrations which fell within physiological limits.

The reinjection of the gastric contents obtained at the time of the distress also reproduced it in some instances, and relief was invariably obtained either by emptying the stomach or by the use of alkalis. He found that the pain was produced most readily during the stage of active symptoms, and was usually absent during quiescent periods and after a course of treatment. Further, from a study of 15 cases he found no evidence of a positive response to acid in the absence of an organic lesion of the stomach or duodenum. He finally concluded that hydrochloric acid was not only an adequate stimulus to the pain-producing mechanism of a sensitive peptic ulcer, but was also the stimulus usually in evidence.

It was evident that if these results could be substantiated and the specificity of the test for ulcer established, the clinician would have an additional valuable method of distinguishing gastric pain due to peptic ulcer from that due to distant foci of irritation—for example, in the appendix, the colon, or the gall-bladder. In a later paper Palmer [3] claimed that his methods provided such a test, and the present investigation which follows very much the lines he adopted was undertaken in order to exploit this so-called acid test as an aid in differential diagnosis, and perhaps to throw additional light on the relationship of gastric acidity to gastric pain.

Technique of the Test.

After a night's fast the patient swallows a Ryle's tube and the stomach is emptied of its resting contents. 200 c.cm. of 0·5 per cent. HCl are then introduced into the stomach through the tube. The patient is kept in ignorance of the nature of the injected fluid and is informed that in all probability he will experience no unusual sensation, but that if he does he is to notify the observer. Suitable literature is provided to divert the mind, and at the end of half an hour, if no pain has been complained of, the stomach is emptied and a further 200 c.cm. of acid are introduced, and this is repeated a third time if necessary. The method is substantially that of Palmer, with the slight variation that the stomach is emptied at the end of each half hour period in order to avoid the accumulation of large quantities of fluid and to maintain the concentration of acid at a high level. The test is regarded as positive if the patient complains of unequivocal pain which he is able to recognise as identical with his previous symptoms, identical, that is, in kind, but not necessarily in degree. Severe pain can be promptly relieved by emptying the stomach or by the use of an alkaline powder.

Results of Investigation.

The total number of cases investigated, the great majority of whom attended my out-patient clinic in the first instance, is 228, and the number of examinations carried out 257. They are divisible into two groups—one consisting of 155 cases in whom organic disease of the stomach or duodenum was demonstrable, and the remainder, 73 in number, in whom no local lesion could be discovered. Reliance was placed on X ray diagnosis in 176 cases, severe hæmorrhage in 6, and surgical intervention in 46.

A comparison of the results obtained in the two groups makes it possible to assess the value of the acid test in differential diagnosis.

TABLE I.—*Organic Diseases of Stomach and Duodenum.*

Diagnosis.	Total cases.	Total tests.	Results of acid test.	
			Pos.	Neg.
Duodenal ulcer	87	105	41	64
Gastric ulcer	50	59	35	24
Gastro-jejunal ulcer	4	4	0	4
Gastric carcinoma	3	3	2	1
Hæmatemesis and melæna ..	6	6	1	5
Gastritis	7	7	3	4
	157	184	82	102

Table I. shows the results obtained from 184 tests carried out on 157 patients suffering from organic disease of the stomach or duodenum. Eighty-two gave positive tests and 102 negative. Peptic ulcer accounts for the great majority of cases, and it will be noted that the proportion of positive results is considerably higher in ulcers of the lesser curvature than of the duodenum. In three cases of carcinoma two were positive, in one of which the pain was agonising, as was also the case in one of the three positive results

* An abstract of this paper was contributed to the discussion on various aspects of gastric chemistry at the Section of Medicine, Royal Society of Medicine, reported on p. 718.

in the cases of gastritis. It is interesting to note that the localisation of the pain, though usually referred somewhat vaguely to the epigastrium, may, when at all severe, be exceedingly accurate and even felt in the back. In one case, that of a duodenal ulcer, pain was, curiously enough, felt only in the left axilla; this localisation was reproduced with great accuracy as a result of a positive acid test.

TABLE II.—*Analysis of 103 Cases of Peptic Ulcer.*

Type.	Cases.	Tests.	+ Acid	Symptoms.		− Acid	Symptoms.	
				Active.	Quiescent.		Active.	Quiescent.
Duodenal	70	88	37	36	1	51	12	39
Gastric	33	41	24	24	0	17	5	12
	103	129	61	60	1	68	17	51

Table II. shows the relationship of the results obtained to the period of the disease in which the test was carried out—whether one of active symptoms or of quiescence. Symptoms were considered to be active when spontaneous pain had been present within the preceding 24 hours. Of the 103 cases that are analysed it will be noted that all the positive results, with one exception, were obtained during a period of active symptoms, but more noteworthy is the occurrence of 17 negative tests during the active period. In one of these, a case of lesser curve ulcer, the symptoms were of recent duration, the pain of unusual intensity, and associated with slight rigidity and a localised area of superficial soreness, so that leakage was suspected.

TABLE III.—*Functional Dyspepsia and Extragastric Lesions.*

Diagnosis.	Total cases.	Total tests.	Results of acid test.	
			Pos.	Neg.
Functional dyspepsia	44	45	4	41
Constipation	12	12	2	10
Chronic appendicitis	7	8	4	4
Chronic cholecystitis	5	5	4	1
Cirrhosis of liver	1	1	—	1
Pancreatitis	1	1	—	1
Adhesions	1	1	—	1
	71	73	14	59

Table III. shows the results obtained in 71 cases where a lesion of the gastric mucosa could be excluded. Forty-four were cases of simple functional disturbance with negative X ray picture, and the remainder examples of gastralgia produced by irritative foci acting at a distance. The 12 cases of appendicitis and cholecystitis were confirmed by operation and the stomach and duodenum found normal in each instance. Nevertheless, four out of seven cases of appendicitis, and four out of five of cholecystitis gave positive acid tests, the pain in the latter being severe and in one case of appendicitis exceptionally so.

Thirty-four cases of ulcer were submitted to operation, and I have to thank my surgical colleague, Mr. H. H. Sampson, under whom the patients were admitted, for permission to make use of this material from which it is possible to obtain a clearer conception of the state of the ulcer in relation to the acid response. The acid test was found to be negative in 20 cases in whom little or no evidence of healing was observed at the operation.

As regards the results of treatment, 24 cases of ulcer with positive results were examined at the end of a course of medical treatment. In all but one the test was negative, and that was a case of a large active ulcer associated with an hour-glass constriction of the stomach. How soon the test becomes negative I am not prepared to say, but I have found it so a week from the commencement of treatment. One test was carried out a week after gastro-jejunostomy and was found to be negative, and a negative result was present a week after removal of the appendix; in both cases the test had previously been positive.

Discussion.

As a result of this investigation I have attempted to supply answers in part or in whole to two questions: (1) Is there an acid response sufficiently specific for ulcer cases to constitute a test of diagnostic value? (2) What part does hydrochloric acid play in the production of gastric pain?

The answer to the first question must clearly be in the negative, for pain typical in every way of ulcer, both as regards severity and localisation, was forthcoming, though not so commonly, in cases where a lesion of the gastric mucosa could undoubtedly be excluded (Table II.). General considerations would suggest that this must be so for the pains of ulcer can be simulated with absolute fidelity by a number of extra-gastric lesions, and must therefore almost certainly share with them a common mechanism. The discrepancy between the results described in this paper and those of Palmer can only be explained on the assumption that his cases were either examined during a period of quiescence or, more probably, were too few to bring out this point, for his series contains only one example each of chronic cholecystitis and subacute appendicitis, the lesions most likely to simulate ulcer in their symptomatology.

As regards the second question—the rôle of hydrochloric acid in the production of gastric pain—the matter is more difficult, and I am not prepared with a satisfactory answer. There seem to be three possible ways in which a chemical irritant might act: (1) by irritating the exposed nerve-endings in an area of ulceration; (2) by causing local spasm at the ulcer site and thus interfering with normal peristalsis; or (3) by causing a primary increase of tonus, as recently suggested by Poulton.[4]

The first two possibilities may be largely discounted, for in addition to being generally discredited on experimental grounds they fail to account for pain in the absence of structural defect. That there may be a local factor in certain instances is, however, suggested by some work of Ivy privately communicated to Alvarez,[5] which suggests that though not normally sensitive to painful stimuli, a mucous membrane, the seat of œdema or congestion, may become so.

The production of an increase in gastric tonus, and so pain, by hydrochloric acid lacks proof. All that can be said at the moment is that gastric pain typical in every way of ulcer has been produced by a number of experimenters, notably Poulton [4] and Hardt,[6] without calling in an acid factor: Hardt indeed in one case of gastric ulcer actually brought about relief by the introduction of 0·3 per cent. hydrochloric acid.

Palmer regarded hydrochloric acid as the adequate stimulus for ulcer pain normally present in the gastric juice; that it may be adequate in supernormal concentrations and at times in physiological ones he has abundantly proved, and his results have been confirmed in this paper, but when in his final summary [7] he states that acid is the normal stimulus for the pain mechanism I find it impossible to follow him, for my investigations so far as they go are definitely opposed to such a view. In the first place, the pain is rarely severe, and the patient, though able to identify it, will often volunteer the information that it is not nearly so severe as his typical distress, and this, be it noted, in the presence of acid values far in excess of those ever present in health or disease. The pain rarely shows itself when the acid concentration is at its maximum, that is, immediately after its introduction. Frequent analyses show that the acidity has usually undergone some reduction, at times considerable, before complaint is made. It is possible to explain this latent period on the grounds of a diminished threshold, but this is by no means always borne out by the patient's symptoms, and I have recounted one

case of gastric ulcer of quite exceptional severity with a negative acid test.

With the weaker solutions, 0·25 per cent., I have frequently failed to get a satisfactory response when it was readily provoked by the stronger, and in the following experiment the reintroduction of gastric contents failed to reproduce pains of anything like the severity with which they were previously associated, and a subsequent injection of 0·5 per cent. HCl was practically without effect.

CASE R. B.—Big lesser curve ulcer; gastro-jejunostomy previously.

	Fasting juice, 15 c.cm.	Free HCl. 14 c.cm.*
9.45 :	200 c.cm. tap water.	
10.15 :	10 c.cm. only left	5 ,,
	200 c.cm. 0·5 per cent. HCl.	142 ,,
10.20 :	Pain severe.	
10.30 :	Stomach emptied 250 c.cm.	64 ,,
	Pain went at once.	
10.50 :	Contents 250 c.cm. reintroduced.	
11.10 :	Pain very slight indeed.	
11.20 :	Pain gone.	
11.50 :	Stomach emptied 35 c.cm.	12 ,,
11.50 :	100 c.cm. 0·5 per cent. HCl.	142 ,,
12.5 :	Pain slight.	
12.15 :	Stomach emptied 105 c.cm.	65 ,,
12.20 :	Pain much easier.	

* 1/10 N. soda per cent.

It might have been expected if hydrochloric acid were the normal stimulus for pain production that some relationship would be found between the type of pain the patient complained of, whether early or delayed after meals, and the latent period following the acid test, but no such relationship could be established, the proportion of positive results occurring during the first and second periods being roughly the same in the 47 cases in which this point was specifically noted. (Table IV.)

TABLE IV.

Type of pain.	No. of positives.	Period of test.		
		First.	Second.	Third.
Early ..	20	12	7	1
Delayed ..	27	17	9	1
	47	29	16	2

The use of histamine naturally suggests itself as a means of adding confirmation to the acid theory, but I have so far failed to produce any sensation whatsoever in ten ulcer patients, previously acid positive and still in an active phase, by the injection of one milligramme of histamine acid phosphate, though the subsequent acid values were well above normal; and in a recent experiment a failure with histamine was immediately followed by a positive result with 0·25 per cent. of HCl, though the acid values were at a considerably lower level.

CASE W. B.—Duodenal ulcer.

	Fasting juice 25 c.cm.	Free HCl. 10 c.cm.*
Zero :	1 mg. histamine acid phosphate	
10 mins. :	Stomach emptied 26 c.cm.	32 ,,
17 ,,	,, ,, 35 ,, ...	70 ,,
32 ,,	,, ,, 62 ,, ...	95 ,,
44 ,,	,, ,, 21 ,, ...	89 ,,
48 ,,	,, ,, 15 ,, ...	83 ,,
	200 c.cm. 0·25 per cent. HCl.	
50 mins. :	Pain began.	
60 ,, :	Pain fairly severe. Specimen	74 ,,
65 ,, :	Pain easier.	46 ,,
70 ,, :	Pain almost gone.	
72 ,,	,, ,, ,,	
80 ,, :	Stomach emptied 100 c.cm.	37 ,,
85 ,, :	Pain still just appreciable.	
95 ,, :	200 c.cm. 0·5 per cent. HCl. Pain at once.	
100 mins. :	Pain worse	137 ,,
110 ,, :	Pain still severe. Specimen	51 ,,
	One drachm magnesium phosphate.	
115 mins. :	Pain easier	32 ,,
117 ,, :	Pain gone	67 ,,

* 1/10 N. soda per cent.

It may be that the volume of the injected fluid plays a part, but I have no evidence to show that this is so, and I recall two cases in which the pain increased in severity after the stomach had been emptied.

Clinical observation from many aspects tends to support these findings and to suggest that the pains of peptic ulcer are independent of acid concentrations, for it is well recognised that severe and typical distress may be associated, though not commonly, with achlorhydria. The rapid relief of pain which follows the institution of an ulcer régime, whether associated with intensive alkalinisation as in Sippy's methods or following those of Lenhartz and Smithies in which alkalis play no essential part, is rarely accompanied by any lowering of acid values, and the present author [8] concluded that clinical improvement was independent of chemical change in a considerable number of cases, while in a few it was actually associated with a rise in acidity. Crohn and Reiss,[9] as a result of an intensive study of 34 ulcer cases treated by Sippy's methods, found a rough parallelism only between clinical and chemical improvement.

The view that alkalis relieve gastric pain by a process of neutralisation must also be subject to criticism, for it is noteworthy that such a result may be equally prompt in cases where the acid values are low, and indeed in some cases of carcinoma where free acidity is absent. Fractional studies, too, show that such neutralisation is of very brief duration, and is usually followed by a rise in acidity in excess of that previously recorded; yet the clinical relief outlasts the period of neutralisation and is unaffected by the subsequent hyperacidity. The explanation of the beneficial action of alkalis is probably that advanced by Spencer, Meyer, Rehfuss, and Hawke,[10] who found that these substances brought about a more rapid emptying of the stomach.

Such evidence, then, as I have been able to bring forward in this paper is opposed to any view which assigns to hydrochloric acid anything but a very minor rôle in the mechanism of gastric pain. The vagaries of gastric pain are well known. It comes and goes in a manner which suggests little dependence on chemical factors. The internal influences, infection, fatigue, tobacco, and the external ones, worry, rest, change, speak for a nervous rather than an acid control, and while it cannot be denied that the gastric acidity may occasionally be effective it must be emphasised that no theory of gastric pain can be regarded as satisfactory unless it will explain all the facts.

Conclusions.

1. Hydrochloric acid in concentrations of 0·5 per cent. will reproduce typical gastric pain in certain susceptible individuals suffering from painful disturbances of gastric function.

2. The pain occurs independently of any local disease in the stomach or duodenum.

3. The rôle of hydrochloric acid is discussed and the view put forward that it plays no essential part in ordinary pain production.

I gratefully acknowledge the valuable help I have received from Miss Fisher and Miss Graham, nursing sisters, in carrying out the tests, and from Mr. Garfield Thomas, biochemist to the hospital, who undertook numerous chemical analyses.

References.

1. Hurst, A. F.: Sensibility of the Alimentary Canal, London, 1911.
2. Palmer, W. L.: Arch. Int. Med., 1926, xxxviii., 694.
3. Same author: Jour. Amer. Med. Assoc., 1927, lxxxviii., 1778.
4. Poulton, E. P.: THE LANCET, 1928, ii., 1223.
5. Alvarez, W. C.: Mechanics of the Digestive Tract, London 1928.
6. Hardt, L. J.: Jour. Amer. Med. Assoc., 1918, lxx., 837.
7. Palmer, W. L.: Arch. Int. Med., 1927, xxxix., 109.
8. Hardy, T. L.: Acta Med. Scandinav., 1926, lxiv., 427.
9. Crohn, B. B., and Reiss, J.: Jour. Amer. Med. Sciences, 1920, clix., 70.
10. Spencer, W. H., and others: Amer. Jour. Phys., 1916, xxxix., 459.

A CONTROL OBSERVATION WITH SANOCRYSIN.

By B. R. CLARKE, M.D. Belf.,
MEDICAL SUPERINTENDENT, FORSTER GREEN HOSPITAL, BELFAST;
AND
H. G. K. HADDICK, M.B., B.Ch. Belf.,
FORMERLY HOUSE PHYSICIAN AT THE HOSPITAL.

SINCE May, 1925, certain patients suffering from pulmonary tuberculosis have been treated with sanocrysin at the Forster Green Hospital. Marked improvement followed the treatment in some instances, and encouraging reports from other observers have been published. It was, however, decided to carry out a control observation during 1927. The difficulty of assessing the value of any treatment of pulmonary tuberculosis is notorious, and it is the opinion of the writers that no treatment has gained anything like general acceptance, except the régime known as sanatorium treatment and in selected cases collapse therapy. Thus, after many years' trial, some competent physicians have abandoned tuberculin therapy, while others continue to advocate it. Alpine treatment, once regarded as the *ne plus ultra* of the therapy of tuberculosis, also has its critics. Sanocrysin treatment is certainly not free from danger, and it is expensive and troublesome—three special reasons why it is imperative to assess its value, if it is to be considered at all. Several observers, some of whom are undoubted authorities on the treatment of tuberculosis, have recorded no good results from sanocrysin treatment.

These were some of the considerations which suggested an observation of the results of sanocrysin treatment with a control group of similar cases. Moreover, it was not practicable to treat more than a limited number of patients, and therefore it seemed justifiable to select the cases in such a way that a control observation could be made. Sanocrysin treatment would not have been withheld from any patient in the control group—if he had asked specially for it and had been considered a suitable case.

Dr. F. R. Walters [1] emphasises certain conditions which must be fulfilled before a treatment of pulmonary tuberculosis can be tested. So far as possible these conditions have been fulfilled in carrying out the observation. The conditions were as follows:—

(1) All patients admitted during 1927 who had tubercle bacilli in the sputum were divided into two groups alphabetically. Those whose names began with the letters A to K did not receive sanocrysin treatment; those whose names began with the letters L to Z received sanocrysin treatment, if they appeared suitable and were willing to have it. (2) Patients readmitted to the hospital or who remained for less than six weeks were excluded from the observation. Of course this method does not ensure that the two groups would be strictly comparable, but it excludes any conscious or unconscious selection of the more favourable cases for the special treatment. It appeared, from a common sense point of view, that if the control group did as well as the sanocrysin-treated group, it might reasonably be inferred that sanocrysin was without much value. On the other hand, if the results in the sanocrysin-treated group were much better, there would be, at least, a case worth further examination. At the same time, an attempt was made to compare the two groups in every respect which might have a bearing on prognosis.

The following factors were considered: (1) Sex; (2) family history; (3) duration of disease from first symptoms; (4) temperature on admission to hospital; (5) pulse-rate on admission to hospital; (6) presence of cavity clinically; (7) presence of cavity radiologically; (8) extent of involvement of the lungs radiologically; (9) classification, devised by the Society of Superintendents of Tuberculosis Institutes; (10) complications.

Altogether [2] 112 patients having tubercle bacilli in the sputum were admitted to hospital during 1927; 2 of these were readmissions and 13 remained less than six weeks in hospital (one readmission in A to K group, one readmission in L to Z group; five remained less than six weeks in A to K group; eight remained less than six weeks in L to Z group). The 97 patients to be considered were divided as follows:—40 patients whose names began with the letters A to K; 57, L to Z.

The following tables compare the condition of the two groups on admission to hospital. Throughout this paper normal temperature is regarded as 98·6° F.;* subfebrile temperature is regarded as 98·6° to 99·6° F.; * febrile temperature is regarded as higher than 99·6° F.*

Normal pulse-rate is regarded as: Not more than 80 (*a*) and 84 (*b*).

Moderate pulse-rate: 80–96 (*a*) and 84–100 (*b*).

Rapid pulse-rate: More than 96 (*a*) and more than 100 (*b*).

(*a*) Evening pulse-rate for men, and (*b*) for women.

Comparison of Sanocrysin Group L to Z with Control Group A to K.

1. Sex.

	A to K.	L to Z.
Male	19	27
Female	21	30

2. Family history of tuberculosis.

Positive	21	29
Negative	19	28

3. Duration from first symptoms

Months—		
Less than 3	6	11
3 to 6	10	15
More than 6	24	31

4. Temperature on admission.

Normal	17	17
Subfebrile	16	25
Febrile	7	15

5. Pulse-rate on admission.

Normal	7	6
Moderate	21	33
Rapid	12	18

6. Presence of cavity, clinically.

	A to K.	L to Z.
Present	12	20
Absent	28	37

7. Radiological shadows suggesting cavity.

Present	23	41
Absent	17	16

8. Extent of lung involvement, radiologically.

1. Zone	0	} 25	3	} 30
2. Zones	14		9	
3. „	11		18	
4. „	9	} 15	14	} 27
5. „	5		8	
6. „	1		5	

9. Classification on admission.

Incipient	2	7
Moderate	23	25
Advanced	15	25

10. Complications.

—	A to K.	L to Z.	Total.
Tuberculous laryngitis	4	8	12
Fistula-in-ano	1	3	4
Cervical adenitis	1	2	3
Tuberculous osteitis of femur	—	1	1
Spontaneous pneumothorax	—	1	1
Tuberculous meningitis	1	—	1
Thrombosis of femoral vein	1	—	1
Tonsillitis	—	4	4
Hæmorrhoids	—	1	1
Goitre	—	2	2
Duodenal ulcer	—	1	1
Epilepsy	—	1	1
Nephritis	2	—	2
Total	10	24	34

The comparison of the two groups shows that the sanocrysin-treated group appears to have a more unfavourable prognosis than the control group with reference to the temperature on admission, pulse-rate on admission, presence of cavity, clinically and radiologically, and extent of lung involvement radiologically. On the other hand, the control group contained a higher proportion of patients whose first symptoms appeared more than six months before admission.

Sanocrysin treatment was attempted or completed in 39 patients of the L to Z group. Artificial pneumothorax was tried in 12 patients of the L to Z group and 14 patients of the A to K group.†

* Evening mouth temperature.

† The high proportion of artificial pneumothorax cases is largely due to the fact that patients are often selected for admission by the tuberculosis officers because of their suitability for this treatment.

In considering the results of treatment two patients in the A to K group and two patients in the L to Z group, who are still in hospital, have been regarded as discharged on Oct. 17th, 1928, their condition on that date being regarded as their condition on discharge.

Results.

1. *Immediate Result of Treatment, as shown by Condition on Discharge.*

Group.	Quiescent.	Improved.	Unchanged.	Worse.	Total.
A to K (control group)	4	28	5	3	40
L to Z (sanocrysin group)	20	26	7	4	57

Of the patients in the control group A to K five had an artificial pneumothorax with satisfactory collapse (quiescent, 2; improved, 3). In the sanocrysin-treated group L to Z four patients had artificial pneumothorax treatment with satisfactory collapse (quiescent, 2; improved, 2). Excluding these nine cases the results are shown below.

2. *Immediate Result (excluding Nine Cases which had a Satisfactory Artificial Pneumothorax).*

Group.	Quiescent.	Improved.	Unchanged.	Worse.	Total.
A to K (control group)	2	25	5	3	35
L to Z (sanocrysin group)	18	24	7	4	53

3. *Sputum on Discharge from Hospital.*

Group.	No tubercle bacilli or no sputum.	Bacilli present, but less than 1/10 number of bacilli on admission.	No improvement.
A to K ..	6	7	27
L to Z ..	24	8	25

4. *Result of Treatment with Reference to the Duration of Stay in Hospital.*

Time in hospital in months.	Group.	Quiescent.	Improved.	Unchanged.	Worse.
Less than 3 ..	A–K	—	4	1	1
	L–Z	2	8	3	0
3 to 6	A–K	1	13	1	1
	L–Z	5	3	0	2
6 to 9	A–K	3	5	2	1
	L–Z	7	5	2	1
9 to 12	A–K	0	4	0	0
	L–Z	2	8	0	0
More than 12 ..	A–K	0	2	0	0
	L–Z	4	2	2	1

5. *Number of Patients known to be Dead on Dec. 31st, 1928.*‡

Group.	Number.	Dead.
A–K	40	11
L–Z	57	7

Note on the L to Z Group from which the Sanocrysin Cases were Selected.

There were 57 patients in this group and 39 of these had sanocrysin treatment. In eight cases the treatment was considered unnecessary; in seven it was contra-indicated, and three refused it.

‡ All patients included in the observation will be traced in January, 1929.

Of the 39 patients treated with sanocrysin the treatment was completed in 30 and given up in 9. The reasons for abandoning treatment in these 9 cases were as follows:—

Failure to improve ..	3	Progressive loss of weight..	1
Diarrhœa	2	Focal and general reaction	1
Albuminuria	1	Acute tonsillitis	1

The results of treatment in these 9 cases were as follows:—

Quiescent	0	Unchanged	4
Improved	2	Worse	3

Considering the 30 cases whose treatment was completed, the results were as follows:—

Quiescent	15	Unchanged	1
Improved	13	Worse	1

Of the 30 patients whose treatment was completed 26 gained and 4 lost weight during the course of the injections. Of the 9 patients whose treatment was not completed 2 gained and 6 lost weight. One patient was not weighed.

It is not the purpose of this article to discuss the details and technique of sanocrysin treatment. The method used in all cases was the system of graduated dosage which is now widely employed. Graduated dosage has been the invariable rule at the Forster Green Hospital since August, 1925, and the loss of weight, which was so common a feature of the first cases, is now exceptional. Thus of the 39 cases treated in 1927 28 gained and 10 lost weight during the injections. The average gain of weight during the treatment was 7 lb., the greatest gain being 31 lb. in 14 weeks. The average loss of weight was 2½ lb., the greatest loss being 5½ lb.

The complications which occurred during the sanocrysin injections were as follows:—

Febrile reactions following an injection	13	Diarrhœa	2
Subfebrile reactions following an injection ..	12	Stomatitis	1
Well-marked albuminuria	9	Dermatitis	1
Transient albuminuria ..	8	Neuritis	1
Vomiting	3	Focal and general reaction	1
		Œdema of the eyelids ..	1

Two other clinical observations of cases, treated with sanocrysin and compared with similar "control" groups, have been published by Würtzen [3] and Bie and Andersen.[4] Both these observations point to the conclusion that the sanocrysin-treated cases do better than untreated cases, and the results obtained at the Forster Green Hospital appear to justify a similar conclusion.

References.

1. THE LANCET, 1927, i., 1272.
2. Tubercle, 1921, iii., 90.
3. Würtzen (Recherches sur les effets de la sanocrysine), by C. H. Würtzen, Levin, and Munksgaard, 1926, p. 224.
4. Bie and Andersen: Acta Tub. Scand., 1927, iii., 61.

LEEDS GENERAL INFIRMARY.—About 14,500 in-patients were admitted last year, 1000 more than in 1927, and surgical cases alone amounted to 5000. Notwithstanding that the average stay of each in-patient is only 11 days, the waiting-list contains more than 1000 names. The out-patients exceeded 50,000, an increase of about 3000. Patients suffering from motoring accidents grew to 1135. Their treatment cost £1775, of which only £167 was repaid. The deficit on ordinary expenditure was £23,500 and the accumulated deficit of the last eight years is £76,550. The income from annual subscribers last year was only £7100.

DONATIONS AND BEQUESTS.—Mr. John Allison Barr, of Pollokshields, Glasgow, left among other bequests, £2000 to Glasgow Royal Infirmary; £1000 each to the Western Infirmary, Glasgow, the Victoria Infirmary, the St. Andrews Ambulance Association, the Glasgow Ear, Nose, and Throat Hospital, the Royal Hospital for Sick Children, the Glasgow Eye Infirmary, and the Royal Glasgow Asylum for the Blind; and £200 to the Royal Samaritan Hospital for Women, Glasgow.—Mr. James Haggart Dewar, of Whittinghame Drive, Kelvinside, Glasgow, left £2000 to the Royal Hospital for Sick Children, Glasgow, and £1000 to the Princess Louise Hospital for Limbless Sailors and Soldiers, Erskine.

Clinical and Laboratory Notes.

AN OBSCURE CASE OF ULCERATIVE ENDOCARDITIS OF THE TRICUSPID VALVE.

By J. F. WILKINSON, M.B., M.Sc., PH.D. MANCH.,
HOUSE PHYSICIAN, MANCHESTER ROYAL INFIRMARY.

THE difficulty in establishing a diagnosis of malignant endocarditis of the tricuspid valve, recorded by Scott Pinchin and H. V. Morlock in THE LANCET of Feb. 2nd (p. 230) is of considerable interest in view of a similar case recently at the Manchester Royal Infirmary under the care of Dr. F. Craven Moore, who allows me to place the following particulars on record.

A policeman, aged 47, was admitted to the Manchester Royal Infirmary on Dec. 24th, 1928, complaining of extreme dyspnœa and excessive perspiration, together with a cough and abundant expectoration. He had had bronchitis for the last 28 years, with more severe exacerbations during the winter months. Five years before he had had an attack of dyspnœa and profuse perspiration, not so acute as the last attack, which had improved after rest in bed. Two years before (1926) he had been confined to bed for two weeks with "rheumatic" pains in both feet, more particularly in the toes, no other joints being affected. Although he had noticed occasional slight œdema of the ankles during 1927, he was well from that time until the last week in November, 1928—the commencement of the present attack. He complained of a slight pain over the right hypochondrium and xiphisternum, which he thought was due to flatulence, and this was followed by two "shivering attacks" in one day. He was better next day and did not come under medical supervision at this stage. Finding himself getting very short of breath and perspiring more profusely than usual, he stayed in bed from Dec. 15th until Dec. 17th, when he returned to duty, but was not able to continue. From that date, until his admission into the Manchester Royal Infirmary a week later, he was confined to bed with an increasing degree of dyspnœa, perspiration, cough, and expectoration. No typical asthmatic attack was described, nor was there any history of rash, purpuric spots, hæmatemesis, hæmoptysis, or hæmaturia. Urine and bowels had been normal, and the patient had abstained from tobacco and alcohol for the last five years and one year respectively.

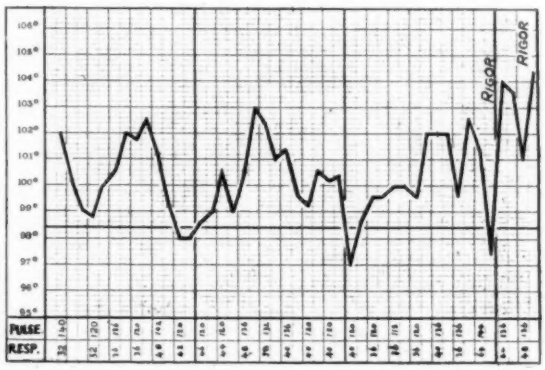
Previous Medical History.—He had been a policeman since his discharge from the army after the Boer war. While in South Africa he had contracted typhoid fever, malaria, and double pneumonia (twice), but had had no other illnesses.

Condition on Examination.—He was a very heavily built man, weighing 20 st. He was very cyanosed and extremely dyspnœic and there was a profuse perspiration, especially over the upper half of the body. His teeth showed evidence of pyorrhœa, but the tonsils were not enlarged and there were no enlarged glands. There were no signs of œdema of the legs, ascites, purpuric or tender spots, rash, or retinal hæmorrhage. His respiration-rate was 32, his temperature 102° F., and his pulse was 140 and regular. The apex-beat was not determined and cardiac dullness was obscured by the emphysema and the thickness of the chest wall. Clear auscultation was difficult owing to the respiratory adventitious sounds and the extreme dyspnœa, which prevented the patient from holding his breath, but there appeared to be a somewhat indefinite, soft systolic murmur between the xiphisternum and the apex. There was no venous pulsation in the neck, and the liver and spleen were not palpable. The lungs were emphysematous. There were generalised rhonchi, moist sounds at both bases, and a slight friction rub at the left base posteriorly. Nothing abnormal was detected in the very large abdomen. Urine and fæces were normal.

Course of Illness.—The patient was sent to the Manchester Royal Infirmary as a case of acute bronchitis with asthma, and the progress was as follows. There was extreme dyspnœa and, although restless, he was only able to turn in bed with assistance. A typical asthmatic attack occurred the first night after admission. Perspiration was very free throughout the course of the illness and did not respond to treatment. The temperature was very irregular (see chart), but the first rigors (three in number) only occurred on Jan. 13th, 1929, three weeks after admission, and were repeated two days later. He complained of slight pain in the left side of the chest posteriorly; there was no abdominal pain. There was much frothy mucous sputum (no tubercle bacilli were found), but no hæmoptysis or staining until Jan. 14th. Cough was variable but not excessive. Two separate and independent attacks of melæna occurred in the second and third weeks respectively after admission. Daily examination of the cardiac condition did not disclose any demonstrable alterations. The urine never contained albumin. During the last week of the illness the left arm and hand became swollen and very tender, as later did the right. This was due to fixation abscesses, from which a practically pure culture of pneumococci was isolated.

On Jan. 14th the *blood count* was as follows: red cells, 3,288,000; white cells, 11,600; hæmoglobin, 60 per cent.; colour-index, 0·94; polymorphonuclears, 72·75 per cent.; lymphocytes, 22·75 per cent.; large mononuclears, 4·25 per cent.; eosinophils, 0; basophils, 0·25 per cent. Slight anisocytosis and poikilocytosis was present. No abnormal cells were seen. Platelets were abundant.

On Jan. 15th, 1929, there was evidence of consolidation at the base of the left lung behind the mid-axillary line,



the illness terminating next day. The patient was unimpaired mentally, and the physical condition did not alter appreciably from the date of admission until the last 36 hours. No radiographic examination could be made owing to the condition and size of the patient.

Post-mortem Findings.—The pericardium was normal. The heart weighed 440 g. The myocardium was of good colour and slightly soft. The right auricle only was moderately dilated, and there were no thrombi. The right ventricle showed slight dilatation but no hypertrophy; the left showed slight dilatation and hypertrophy. The tricuspid valve admitted three fingers; the valve substance showed no old lesion but there was a mass of crumbling vegetations, the size of a hazel-nut, based broadly on the middle of the anterior cusp, and a small mass, the size of a pea, on the septal cusp. The vegetation presented to the ventricular side, which also showed ulceration. The mitral valve admitted two fingers and showed no stenosis; the chordæ tendinæ to the anterior cusp were definitely thickened but not contracted. The anterior cusp showed slight roughening and minute vegetations at its middle portion. The aortic and pulmonary valves were normal. There was moderate atheroma of the aorta and coronary arteries.

Both pleuræ were normal. The right lung weighed 640 g. and showed a moderate degree of vesicular emphysema, well aerated throughout, but no œdema nor consolidation. The left lung weighed 760 g. and showed vesicular emphysema; the lower lobe was somewhat congested and the seat of slight consolidation, chiefly posteriorly; the upper lobe was well aerated throughout. There was moderate congestion of the larger bronchi. There was a group of seven ulcers round the lesser curvature of the stomach near the cardia; the largest, on the posterior wall of the fundus, was 3 by 2 cm., the smallest 1 by 0·5 cm.; they penetrated the mucosa but based on the submucosa, and were evidently of recent origin. The spleen weighed 460 g. and was of moderate consistence, dull red and septic. The liver weighed 2360 g.; a fairly well-marked fatty infiltration accentuated the lobules. The biliary passages were normal. The thyroid gland weighed 90 g. and was fairly large and full of colloid. The kidneys weighed 260 g. each; the capsules stripped normally and the surfaces were smooth, but the cortices were paler than normal; there were no infarcts or abscesses. On the outer aspects of both upper arms there were fixation abscesses at the sites of therapeutic injection.

Several points of interest arise in the consideration of this case. The excessive perspiration and extreme

dyspnœa were notable features and, coupled with the temperature, pulse, and respiration rates and the friction rub at the left base, suggested the possibility of an early pneumonia. The progress of the case did not fully justify this diagnosis and, in view of the history of recent onset of asthma in a man of 47 years of age, the possibility of a thoracic neoplasm was also considered but did not correspond with the clinical condition. The absence of definite cardiac signs, embolic phenomena, or positive blood-culture (cf. Scott Pinchin and Morlock, loc. cit.) or rigors was very striking, the irregular pyrexia being the only sign indicative of a possible cardiac lesion. The sudden melæna occurring in the second and third weeks raised the question of typhoid fever, but appropriate investigation did not support this. The thrombotic gastric ulcers were the only definite secondary results discovered that might be ascribed to the cardiac lesion, and it is interesting to note that no gastric symptoms were described.

Acknowledgment is made to Prof. J. Shaw Dunn for permission to use the records of his post-mortem investigation of this case.

A NOTE ON LEPROUS LESIONS OF THE SCALP.

By A. R. Davison, M.R.C.S. Eng.,
MEDICAL OFFICER, EMJANAYANA LEPER INSTITUTION, SOUTH AFRICA.

In 1927 two native patients of the Emjanyana Leper Institution were discovered to have leprous lesions of the scalp. This is considered to be a very unusual situation. Thus Rogers and Muir ("Leprosy," 1925, p. 143) state:—

"Leprosy bacilli have been found in the corium of the skin over almost the whole body. A noticeable exception to this is the scalp, where, as far as we are aware, leprous lesions are seldom or never found."

They also say (p. 168):

"It is remarkable that there were no lesions of the scalp recorded. We have never yet come across any leprous lesions of the scalp, either as a primary or as a subsequent lesion, though we have met with anæsthesia of the scalp due to leprous disease of the supra-orbital nerve."

Frequency of Scalp Lesions.

Over a period of nine months all new admissions to this institution have been shaved as a routine, and an examination of their scalps has revealed the following figures:—

Total No. of cases.	Nodular infiltration of scalp.	Maculæ in scalp.	No leprous lesions in scalp.
Males, 72.. ..	7	24	41
Females, 53 ..	2	18	33

The percentage of scalp lesions in males is 43 and in females 38. The lesions of the scalp are similar to leprous lesions in other parts of the body, in that they show depigmentation, anæsthesia, and erythematous and raised margins. Lepra bacilli are present in clip smears from these areas. Maculæ are difficult to discern in an unshaved scalp, but nodular infiltration causes a falling of the hair over the affected area and so may be more easily noticed. Examples of our findings are:—

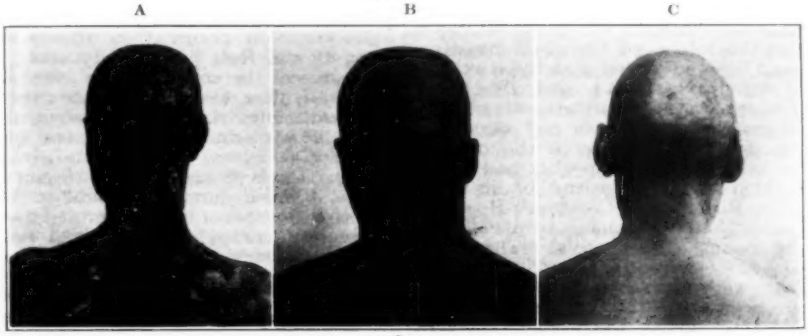
Case 1, female, is in the reactionary phase of the maculo-anæsthetic type, with multiple coalescing maculæ of the scalp. The maculæ have raised erythematous, scaling margins. The centres are anæsthetic. There is an infiltrated plaque over the occipital protuberance. Clip smear three inches above right ear showed lepra bacilli. (Fig. 1A.)

Case 2, male, has maculo-anæsthetic type. Six well-defined maculæ involve the lower border of the scalp. Two are situated below the occiput, one is behind the right ear and three behind the left ear. The maculæ are anæsthetic and have raised margins. Lepra bacilli are present over the occiput. (Fig. 1B.)

Case 3, male, has nodular type infection. There is partial baldness, which extends in parallel lines from the brow to the back of the neck. The skin of the bald areas shows interfollicular infiltration, except over the occiput, where the skin has become papery. Clip smears taken two inches above the occiput and four inches above the right ear show lepra bacilli. (Fig. 1C.)

It is strange that our South African natives should be liable to leprous lesions of the scalp, whereas the natives of India are exempt—though the lesions we found were not suspected and were almost invisible until the scalp was shaved.

Fig. 1.



Case 1.—Maculæ extending to scalp. Case 2.—Maculæ behind ears and over occiput. Case 3.—Nodular leprosy of scalp.

Predisposing Factors.

Factors which may predispose our natives to these lesions are: 1. The negroid type of hair, which is short, frizzled, and scanty compared to that of a European or an Indian. The blood-supply, therefore, is probably less in proportion. The scalp, being less protected by the hair, is more liable to come into direct contact with leprosy-infected articles.

2. The state of personal cleanliness and hygiene is very poor amongst the natives. Pediculosis is common, and it is not unusual to see natives searching one another's scalps with as much gusto as monkeys. Scratching and consequent abrasion of the scalp is therefore not uncommon.

3. Amongst other causes of scalp injuries we may mention the native stick fights, the habit of carrying articles on the head, and the fact that a stone or a block of wood is the usual head-rest at night.

It is obvious, therefore, that the scalp of the South African native is constantly exposed to the entrance of germs, and that the low state of hygiene predisposes to the development of bacilli which have once gained entrance.

The method which we have used for demonstrating the lepra bacilli is simple and efficacious. A fine needle is passed through the skin at the edge of the macula and the transfixed skin is clipped through below the needle. The needle serves the double purpose of rendering the part bloodless and enabling the clipping to be easily transferred to the slide, over which it is firmly smeared. The slide is stained in the usual way.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

Gastric Chemistry.

At a meeting of the Section of Medicine, held on March 26th, Dr. Arthur F. Hurst, the President, being in the chair, a discussion on gastric chemistry was opened by Prof. Leonard Parsons (Birmingham), who read a paper on the significance of

Achlorhydria in Infancy and Childhood.

The subject was, he said, of peculiar importance because of the two opposing views which had been advanced. Faber held that the achylia gastrica of adults was the result of a deep-seated hæmatogenous gastritis, which itself was the result of acute infective disorders in childhood and infancy. Brocq found that achlorhydria occurred in the infectious disorders of childhood, and that it might persist for years after the original disease had been recovered from. Brocq had also investigated the stomach of children who had suffered from infectious disorders and found achlorhydria, with evidence of chronic gastritis. That authority never found achylia in healthy children. Pyelitis might show itself first by diarrhœa and vomiting, and that was associated with achylia. It had been suggested that this diarrhœa was due to extension of organisms from the colon and the small intestine. The suggestion had been advanced that there existed a constitutional achylia gastrica; and Dr. Hurst had stated that there was a constitutional, often a familial, achylia gastrica which was not associated with any known structural change in the mucous membrane of the stomach. The speaker had found cases of achylia which seemed to permit of no other explanation. At the Birmingham Children's Hospital, however, an attempt had been made to attack the problem anew by means of test-meals. The result was that he believed he was now able to show that Dr. Hurst's ideas were not correct. Dr. Parsons submitted five propositions: (1) Achlorhydria might be due to a rapid emptying of the stomach, though sometimes the emptying was found to be slow. (2) It might be due to the type of test-meal used. Or (3) to the presence of enteral infections. (4) In all cases showing supposed achlorhydria there was evidence of secretion of hydrochloric acid, so that it was a false achylia. (5) There was no evidence of innate hyperchlorhydria.

He had investigated 51 cases, and ten of them showed no free hydrochloric acid in the test-meal. The latter was the meal which the child had been having; he had not been using a standard meal. Foods differed in their buffer value. If there was no free hydrochloric acid present, the buffer capacity was the total acid plus the free acid present. Cow's milk had a higher buffer capacity than had human breast milk. If a child was ill, its difficulty in producing that quantity of free hydrochloric acid might lead to achlorhydria. He had been using acid milks—i.e., containing lactic acid and hydrochloric acid. The total acidity curve was made up of protein, HCl, organic acids, and acid salts. Mineral chlorides were found to make no difference to the acid curve. The amount of lactic acid produced in the infant's stomach was insignificant, and therefore the rise of the acidity-deficit curve must be due to the secretion of hydrochloric acid, and that occurred in all cases of achlorhydria.

In artificially fed children the hydrochloric acid was nearly always low. He had arrived at the conclusion that there was no such condition as innate achylia gastrica. He was not clear whether the latter in adults was to be considered the same as the achlorhydria of childhood. Some cases of pernicious anæmia showed no rise in the acid-deficit curve; but in the adult it might be a further stage of the false achylia in childhood.

Dr. W. S. C. Copeman (London) read a paper, by himself and Dr. N. Gray Hill, on

Fractional Test-meals in Childhood.

The submission was made by a series of charts shown on the screen, and was based on the investigation of seven cases in which there was no free hydrochloric acid in 66 children examined, and who were without gastric disorders or history of such. The seven children were of normal height and weight for their age, and their ages ranged from 12 to 15 years. All the children were on a normal mixed diet, and appeared to have no craving for any particular kind of food. The general result was that the total acidity was parallel with the free hydrochloric acid.

Dr. S. W. Patterson (Ruthin) followed with a paper on the

Pathology of Gastric Secretion,

setting out the results of an analysis of 662 cases in which a Rehfuss test-meal was given, and estimations were made of total chlorides, total acidity, and free hydrochloric acid in samples taken at 15-minute intervals. He divided the cases into groups: (1) those showing various types of gastric lesion; (2) those showing various extragastric lesions which might presumably cause reflex disturbance, such as inflammation of the appendix or gall-bladder, gall-stones, colitis, abscesses of teeth, &c.; (3) normal. Considerable variation occurred in the normal group, as Bennett and Ryle had already noted. Achlorhydria was present in some. There was a tendency for duodenal ulcer cases to give a superacidity curve, this sometimes rising by steps until the time the stomach was emptied. In gastric ulcer the curves were normal except when the ulcer was in the pyloric region. Cases of gastritis and carcinoma of the body of the stomach showed subacidity. As to conditions affecting the rest of the alimentary tract, appendicitis cases gave curves within normal limits, but there was a tendency to superacidity in cases of cholecystitis, also in some patients with colitis and diverticulosis of the colon. The acidity curve was lowered by such infections as tubercle, and by septic conditions (tooth abscesses, &c.). When the total acidity was correlated with the state of the pylorus and duodenal cap as revealed by the X ray screen, a grouping took place into those of pyloric or duodenal ulcer with superacidity, pyloric rigidity (as in carcinoma with achlorhydria, pyloric compression, or irritability or spasm) which tended to show some superacidity, and normal.

The Rehfuss test-meal, he said, gave little stimulus to appetite, therefore the results were largely of the chemical or second phase of gastric secretion. An interpretation of the results as variations in response of the secreting fundus glands and the hormone-producing glands of the pylorus offered an explanation of the pathology of gastric secretion. Gastric secretion was altered in cases in which the secreting part of the stomach was replaced, as in carcinoma of the body of the stomach; or when it was absent or atrophic, as in pernicious anæmia; or when it was rendered abnormal by inflammation, as in gastritis; or when it was reduced in efficiency by the presence of tubercle or sepsis in some other part of the body. Dr. Patterson believed that in other cases the receptivity of the mucous membrane of the pylorus to chemical stimulation and in its motor functions lay the key to the pathology of gastric secretion.

Dr. J. F. Venables (New Lodge Clinic) read a communication by Dr. T. W. Turner and himself on the true

Frequency of Hyperchlorhydria in Duodenal Ulcer.

He was, he said, using the classification which Bell arrived at in 1923 as a result of the analysis of 425 test-meals, giving six varieties. It was generally

accepted that in duodenal ulcer the hyperchlorhydria provided the largest percentage of test-meals met with. Cases had often been met with in which the diagnosis was established by X ray findings, a history of occult blood in the stools, &c., and in which the test-meal had belonged to the normal, or even the hyperchlorhydria group. There was no constant test-meal in gastric ulcer. He spoke of an investigation of 40 cases, of which 27 were duodenal ulcer and 13 gastric ulcer. They were given test-meals during the initial investigation, and each case was treated medically, with rest, diet, alkalis, removal of any focal sepsis, &c. A second test-meal was given after general evidence was obtained that the ulcer had satisfactorily responded to medical treatment. Of the 27 duodenal cases, 22 showed a different test-meal after medical treatment had apparently been satisfactorily carried out, and in each case the difference was one in the direction of increased acidity. Five cases showed no variation, four of them originally showing a test-meal which brought them into hyperchlorhydria. One case was that of a man with duodenal ulcer, who had had several hæmorrhages, and deformity evident to X rays. He had hyperchlorhydria, and in every specimen there was a great excess of mucus. He had septic teeth and tonsils. He was treated on medical lines, and the septic foci dealt with. After the ulcer had responded well, the mucus disappeared and he had excessive hyperchlorhydria. Hyperchlorhydria seemed to be an essential part of the duodenal diathesis, not the response to the presence of active ulcer. The rise in acidity he attributed to the disappearance of the gastritis which was present, associated with active duodenal ulcer. In the 13 cases of gastric ulcer there was an increased acidity after the satisfactory conclusion of treatment in 10; the other three showed no rise, though there was no fall either. The final test-meal in that group showed ten cases with a test-meal belonging to the highest group—i.e., hyperchlorhydria—two were "high normals," and one was a hypochlorhydria, the latter having shown achlorhydria when the investigation was started. He suggested that the large number of achlorhydrias after treatment was due to the same factor as in duodenal ulcer, after the crater associated with it had disappeared. He hoped to continue the investigation and have a larger series to present.

Dr. T. L. HARDY (Birmingham) then read an abstract of a paper which appears in full on p. 711 of this issue.

Dr. W. MORRELL ROBERTS (Manchester) submitted a preliminary paper on the

Effect of Oils on Gastric Secretion.

The inhibitory effect of oils and fats on gastric secretion had, he said, been noted many times, but he was not aware of any explanation having been advanced. The diminished acidity of the gastric content in the presence of oil was not due simply to the fact that oil failed to stimulate secretion. It was said that oil inhibited secretion by forming a layer over the gastric mucous membrane, and so protecting it from stimulation by the food constituents, but this would not account for the inhibition of psychical secretion. The purer the specimen of oil used, the more pronounced was the effect, but there was still an unexplained factor which he had not discovered. Additions of oleic acid to pure oils did not greatly interfere with their efficiency. What did seem definitely to emerge was that the higher the iodine value of the oil used, the more effective was it in reducing the stomach secretion. The iodine values in the various oils used in the inquiry were as follows: linseed, 185; cod-liver oil, 153; pea-nut oil, 105; almond, 93; olive, 84. Though oil inhibited gastric secretion in varying degrees when stimulation was supplied by food in the stomach, it was unable to do so when the gastric cells were stimulated by histamine in the circulating blood. If it were true that psychical secretion were inhibited by oil, it must be in virtue of the action of the oil within the stomach.

Discussion.

The PRESIDENT (New Lodge Clinic) said he felt that Prof. Parsons was wrong in the view he expressed in his paper, and the reason was evident in contrasting his results with those set out in the paper of Dr. Copeman and Dr. Gray Hill. The children spoken of by Dr. Parsons were marasmic, whereas the other children dealt with were healthy. There was no particular reason why children with true constitutional achylia should be marasmic. He accepted the statement of Dr. Parsons that all the cases he described were instances of false achylia—i.e., they had not achylia. It was most important to distinguish between achylia and achlorhydria. Achylia gastrica was the complete absence of gastric secretion; achlorhydria was simply absence of free hydrochloric acid. Only very few cases of the latter were due to the former. In achlorhydria mucus was always present; and on washing the stomach out and then giving another test-meal there was, almost invariably, a return of free acid. The wrong treatment was to give these patients acid, because the physician could remove the gastritis and allow them to secrete their own acid by means of systematic lavage. Achylia gastrica he regarded as an inborn error of secretion, unaccompanied by any anatomical change in the gastric mucous membrane. This was strongly supported by the frequency with which the condition was familial. True achylia was chiefly found as an associate of Addison's anæmia. Occasionally one came across a true achylia gastrica in a person apparently healthy, and on going into the family history one learned that relatives had died of pernicious anæmia.

He did not agree with Dr. Patterson that there was atrophy of mucous membrane in pernicious anæmia, as the speaker had found that the cells were present, they simply were unable to secrete. Constitutional achylia was compatible with good health, though the subjects of it were predisposed to diseases more than were ordinary people. He did not think the position of the ulcer in the stomach had anything to do with the secretion. He believed that hyperchlorhydria was the cause of the ulcer, not the result. The recent work of Dr. Venables showed there was, in many cases before the gastric ulcer developed, an excessive acidity associated with a different type of stomach, a type which made the stomach a likely place for ulcer. Dr. Hurst contended that the person with the average stomach could not get an ulcer. And the development of a growth in the stomach did not produce the acidity, and no one had ever seen the acid gradually reduced and disappear as a result of carcinoma of the stomach.

Dr. E. P. POULTON (London) said he did not think it possible that a person could have normal cells in the stomach without producing hydrochloric acid; and if a cell ceased to function it must atrophy. Faber said he had never yet seen a case in which there had been complete absence of hydrochloric acid and absence of ferment too. The speaker suggested that all the cases of achylia were cases of achlorhydria, and probably owning gastritis as a cause. He considered that acid was very important in the initiation of an ulcer, but that it had no part in its continuance. Experimentally, the attempts to keep ulcer alive by means of hydrochloric acid had been disappointing. The chronicity was due, he thought, to mechanical changes. Success in the treatment of gastric and duodenal ulcer had been attributed to giving alkalis, but what was really given were alkaline carbonates and their stimulating action, liberating CO_2, and accelerating the emptying of the stomach.

Dr. G. W. GOODHART (London) appealed to investigators that when they were reporting experiments involving test-meals they should give readers an indication of the times of the emptying of the stomach; also as to whether there was a mixture of

gastric contents or of gastric juice alone in an empty stomach. It detracted seriously from the drawing of accurate conclusions when these essential particulars were not stated. He considered that achlorhydria from carcinoma was much more common than achlorhydria from gastritis. If the President's view was correct that the carcinoma was always preceded by gastritis, Dr. Goodhart thought there should be far more cases of achlorhydria due to plain gastritis than were seen, unless a large proportion of gastritis cases passed on to carcinoma.

The readers of papers briefly replied.

SECTIONS OF COMPARATIVE MEDICINE AND NEUROLOGY.

ON March 27th a combined meeting of these Sections was held, with Major-General Sir JOHN MOORE, President of the Section of Comparative Medicine, in the chair, to discuss

Encephalomyelitis in Man and Animals.

The CHAIRMAN referred to the poisoning of animals by sewage, which, he said, led to nervous symptoms. During the late war he had been requested by General Headquarters to go and see a farmer whose property was on the lines of communication, and who had lost some animals, whilst others were ill, from alleged carbide poisoning of the ponds. It turned out that the cause was impregnation of the water by sewage.

Mr. I. A. GALLOWAY opened the discussion on behalf of the Section of Comparative Medicine, and dealt with diseases affecting domestic animals, in which the chief pathological changes were found in the nervous system. He spoke first of the enzoötic encephalomyelitis of horses, commonly known as Borna disease, from the locality in Saxony, where a severe visitation occurred between 1894 and 1896. This disorder was found on the continent and in America, but no cases, said Mr. Galloway, had so far been reported as occurring in this country.* It seemed to be the same disease as that met with in sheep and cattle. It was infectious, and experiments had shown that animals could be infected by introducing the virus into the nose or by ingestion. The extent of the spread of the disease seemed to be influenced by climate, for it was certainly more prevalent under moist atmospheric conditions and certain districts seemed to be especially affected. The mortality was always high, varying from 70 to 80 per cent., and the cause of the disease was a virus of ultra-microscopic minuteness. In spontaneous cases the incubation period had not been determined; in experimental cases a long time elapsed between inoculation and death. In the rabbit this period was about 30 days, in the monkey 89 days, in the rat or mouse 20 to 82 days, and in the horse 50 to 80 days. The lesions in the peripheral nervous system were important, as they suggested that the symptoms might not be entirely central in origin. Comparative studies had shown that the virus of enzoötic encephalomyelitis was disseminated in the animal organism like the virus of rabies, herpes, and poliomyelitis. Even in mild degrees Borna disease had a high mortality, and animals which recovered from one attack were not thereby rendered immune to a second one. It was not clear whether the second attack was due to reinfection or to a persistence of the first infection. Attempts had been made in rabbits to shorten the incubation period by giving intracerebral inoculations, but they had not been successful. Attempts had also been made to immunise rabbits by using a virus killed by heat, chloroform, carbolic acid or glycerin; but again without success. A formalised vaccine inoculated subdurally, with a second dose several days later, had protected 3 out of 11 animals (rabbits and monkeys).

* Prof. James McIntosh lately stated in our columns (THE LANCET, 1928, ii., 1051) that he had found signs of the disease in a pony which developed it in the Island of Skye.—ED. L.

Mr. Galloway also gave an account of the disease called paralysis of fowls, a specific condition described in Germany, America, and Holland, which he had recently found in this country. Among the symptoms were a partial and progressive paralysis of the wings and legs, sometimes associated with ocular disturbance, and these facts suggested that it was due to infection. In this disease also the chief pathological changes were found in the nervous system. In the peripheral nerves the essential feature seemed to be an intense infiltration with lymphoid plasma cells and large mononuclears. In some of the cases the whole nerve tissue seemed to be replaced by the infiltrating cells—an infiltration so intense as to be unequalled in any other encephalomyelitis. The myelin sheaths degenerated secondarily as a result of the infiltration. Similar infiltrations, chiefly vascular, were found in the brain, cord, and meninges, and also in the spinal ganglia. The disease could be transmitted to other chickens by intracerebral injection of emulsion of the nerve tissues of the paralysed fowls.

Dr. J. G. GREENFIELD said that from the pathological point of view there seemed to be three main groups of encephalomyelitis—those due to visible organisms, those due to a distinct species of neurotropic virus, and those which followed infective fevers. In the first of these groups the inflammatory process in the nervous system resembled that in other organs, except that nervous tissue seemed to be particularly vulnerable. Inflammation was found to be either focal or more diffuse according to the extent of distribution of the organism and the patient's power of resistance. The second group included encephalitis lethargica, Borna disease, rabies, and the herpes encephalitis found in rabbits. Here the virus was diffused throughout the nervous system, though it primarily attacked the neuron, probably by invading the nerve cell. Sometimes the nerve reacted by forming special structures, such as Negri bodies. Certain parts of the nervous system seemed to be especially liable to attack; examples were the selection of the substantia nigra in encephalitis lethargica and the hippocampus in rabies. The cases in the third class were characterised pathologically by focal demyelination without destruction of neurons, the foci being chiefly round vessels, along the walls of the ventricles, and round the margin of the cord.

Dr. W. RUSSELL BRAIN drew attention to an insufficiently recognised group of cases which had been tentatively described as acute infective encephalopathies. They comprised cases in which acute or subacute cerebral symptoms were produced by a toxæmia resulting from infection without the infecting agent being in the nervous system. Three clinical groups could be recognised: (1) those in which the symptoms were exclusively or mainly meningeal; (2) those in which there were both meningeal or cerebral and spinal symptoms; and (3) those having spinal symptoms without cerebral.

Prof. TOM HARE spoke of distemper and other diseases in dogs, and Mr. LESLIE PUGH gave a short account of work in connexion with a specific encephalomyelitis of the dog, independent of distemper.

MEDICAL WOMEN'S INTERNATIONAL ASSOCIATION.—This Association is holding its quinquennial meeting in Paris from April 10th to 15th, and it is expected that representatives from some 20 countries will attend. Beside the Council and general meetings there will be three scientific sessions on the afternoons of April 11th–13th, which will be open to all medical women. The subjects for discussion will be Sex Instruction for Children and Adolescents and Analgesia in Midwifery. The programme of social activities includes a reception given by the President of the French Senate at the Palais du Luxembourg, and another by the President of the Municipal Council at the Hôtel de Ville. Special arrangements have also been made for visiting the Radium and Pasteur Institutes, as well as several of the most notable hospitals of Paris. Further information may be had from the hon. secretary, Dr. L. Martindale, 28, Weymouth-street, London, W. 1.

Reviews and Notices of Books.

Medical History of Canada.

Four Centuries of Medical History in Canada and a Sketch of the Medical History of Newfoundland. By John J. Heagerty, M.D., D.P.H. Bristol: John Wright and Sons, Ltd. 1928. In 2 vols., pp. 395 and 374 respectively. 50*s*.

Dr. J. J. Heagerty, who is attached to the Canadian Department of Health, is to be thoroughly congratulated upon a valuable work, the title of which does little to convey the range and interest of the contents. Learning as well as industry have gone to the compilation of this record, for the volume is not only a survey of the medical history of Canada since the days of Francis I. of France and Jacques Cartier, but it provides a vivid picture of the medicine, surgery, and public health of the provinces and cities as they have developed, describing the whole machinery of sanitary government in the Dominion, while dealing fully with the epidemic diseases as they have been known to occur since European incursion brought with them their tales of infection.

The section on epidemic diseases with which the first volume commences is a particularly full one, forming a many-sided selection of notes upon the various pestilences against which the strict, and indeed inhuman regulations of quarantine were set up. Few readers would know exactly what to expect in a chapter headed "Ship Fevers," for the words "ship fever" and the popular term "yellow jack" were commonly interchangeable in nautical reports—i.e., "ship fever" was yellow fever. But it is clear from a chapter of lurid interest that under the name "ship fever" were also included typhus, which was particularly fatal to the numerous Irish emigrants of the middle of the nineteenth century, typhoid fever, plague, leprosy, and small-pox. Plague may have been an infrequent guest on board even the miserably ill-found vessels of the eighteenth century, but some of the records that are quoted show that it certainly did occur, the usual story being that the ship had departed from Marseilles where plague was ever rife to make for the important French settlement of Quebec. It seems that while in certain old records yellow fever and plague appear to have been used as identical terms, the differentiation between plague and small-pox was also quite hazy, and the symptoms of each might and probably were attributed to syphilis. An interesting chapter deals with "Mal de la Baie St-Paul" which is described at considerable length without any exact conclusion being come to as to its nature. The greater number of the symptoms could be accounted for on the supposition that the patients were the victims of syphilis disseminated extra-congenitally, but syphilis of a form with which we are to-day not familiar.

The distinctly clinical section of epidemiology is followed instead of preceded by a section describing the pioneer physicians of Canada, the early medical journals, the early scientific societies, and the development of public health departments. This section is completed in the second volume, the rest of which is made up of the history and descriptions of the medical schools and hospitals of the Dominion, while the story as it occurred in Newfoundland appears in an appendix.

The information upon medical journalism will be informing to the increasing number of practitioners who take an interest in the development of medical literature. The first medical journal published in Canada—namely, the *Quebec Medical Journal*—appeared in 1826, and had among its editors the founder, Dr. Xavier Tessier, and a committee among whom were the Quebec physicians Joseph Painchaud, Joseph Parent, Joseph Morrin, François Blanchet, C. N. Perrault, P. M. Bardy, and W. A. Hall, and the Montreal physicians Caldwell, William Robertson, and John Stephenson. The large element of French thought continued to be represented much later when the *Dominion Medical Journal* was published in Toronto for the first time in the city of Toronto in the year 1868, the *Lancette Canadienne*, the French medical journal of Montreal having disappeared some 20 years earlier. Then in the year 1872 came the *Canadian Medical Record* of Montreal, the *Canadian Medical and Surgical Journal* of Montreal, and *l'Union Médicale du Canada* also of Montreal. *L'Union Médicale du Canada* was in the beginning a quarterly but later was published as a monthly when it was known as the *Revue Mensuelle de Médecine et Chirurgie*. It is still being published. The more modern developments of medical journalism in Canada need not be recapitulated, but their origins and provenence are fully set out and form a curious bibliographical note.

No purpose would be served by a summary survey of the pages of these handsome volumes; the work is eminently readable as well as worth reading, and we commend it to readers for their study. The lessons in medical politics to be derived, almost unconsciously, from historic records of this sort are often of unexpected aptness.

Diseases of the Liver, Gall-bladder, and Bile-ducts.

Third edition. By Sir Humphry Rolleston, Bart., K.C.B., M.D., Hon. D.Sc., D.C.L., LL.D., Regius Professor of Physic in the University of Cambridge; Emeritus Physician, St. George's Hospital; Sometime President of the Royal College of Physicians of London; and John William McNee, D.S.O., M.D., D.Sc., F.R.C.P., Associate Physician to University College Hospital. Illustrated. London: Macmillan and Co., Ltd. 1929. Pp. 884. 42*s*.

Since the second edition of this book was published in 1912 many advances in the subject have been made which have necessitated considerable additions. Particularly is this true with regard to jaundice. The subject is approached with a review of the more important recent experimental advances, and a statement of the present theories and known facts of the physiology of bile-pigment and bile-acid formation. A discussion follows of the van den Bergh reaction, the technique of which is given in an appendix at the end of the book, and the influence that this test has had on the classification of various types of jaundice into obstructive hepatic jaundice, toxic and infective hepatic jaundice, and hæmolytic jaundice. "Catarrhal" jaundice is placed in the second group, and the view is expressed that it is due to an infection involving both bile-ducts and liver cells rather than to an obstruction at the lower end of the common bile-duct, as was suggested by Virchow.

In the chapter on tests for hepatic function due emphasis is laid upon the fact that the multiplicity of reactions controlled by the liver makes it impossible to estimate the efficiency of the organ as a whole by chemical methods, which are chosen to test quantitatively some single function of the organ. If the lævulose test shows impaired carbohydrate function, it does not follow that the action of the liver on proteins is also impaired. The various tests for hepatic efficiency are therefore discussed in relation to the specific metabolic activity that they are designed to test. They include tests depending on the excretion of dyes by the liver, on carbohydrate, fat, and protein metabolism, on the formation of fibrinogen, on the detoxifying power of the liver, the Widal hæmoclasic function, and the biliary function. The technique and value of each test are briefly discussed. The radiological diagnosis of diseases of the biliary tract are well described, with a brief history of the development of the technique now practised, and the methods of administration and value in X ray diagnosis of iodine and bromine compounds. The ample references in the text and excellent index add to the value of this work. Many accounts of actual cases are given, and 54 fresh illustrations have been added.

The whole book is up to date, and provides a complete account of present knowledge of diseases of the liver and its appendages.

SURGERY OF JOINTS.

Die Chirurgie der Gelenke und Schleimbeutel. By Profs. E. SEIFERT, E. STAHNKE, Med. Rat. Prof. F. KÖNIG, all of Würzburg. Berlin and Vienna: Urban and Schwarzenberg. 1928. Pp. 315. M.20.

THIS instalment of a work designed on an encyclopædic scale is not unworthy of its foregoers. It is fasciculus 23 of Vol. II. of the second part of "Die Chirurgie," a comprehensive presentation of general and special surgery edited by Prof. Dr. M. Kirschner, of Tübingen, and Prof. Dr. O. Nordmann, of Berlin. Its authors show a tendency to lay more stress upon rarities and novelties than on the everyday subjects of surgical work and demonstration. For instance, we find that four pages and a coloured plate are devoted to Kienbock's disease of the semilunar bone of the wrist, whereas gonorrhœal arthritis gets just three. On the whole this fasciculus, despite its size, gives us the impression of treating its subject matter in a sketchy manner. Eight pages only are given up to a discussion of tuberculous disease of the hip. Section A of this fasciculus treats of the surgery of joints, excluding tuberculosis; Section B of tuberculosis of joints, and Section C, which consists of only six pages, deals with surgical diseases of bursæ.

The volume contains no details of treatment, only a very few illustrations of appliances, no descriptions of operations, and no discussion of the best ways of treating chronic joint disease. Osteo-arthritis, which is known in Germany as arthritis deformans, receives the fullest consideration among non-tuberculous lesions, but what is distinguished in this country as rheumatoid arthritis is passed over cursorily.

Perhaps the details of treatment will receive full consideration in another fasciculus, but we have failed to find any mention of such a one in the prospectus of the work as advertised on the cover.

COMPARATIVE ANATOMY.

The Frog. Twelfth edition. By the late A. MILNES MARSHALL. Edited by H. G. NEWTH. London: Macmillan and Co. 1928. Pp. 182. With 40 figures. 6*s*.

IT is a pleasure to see yet another improved edition of this incomparable "introduction to anatomy, histology, and embryology." Since 1882 it has guided innumerable students into the true faith, and its solid soundness will, we hope, carry it on indefinitely as a very good book. Mr. Newth's alterations and improvements are conceived in the right spirit of respect for a tradition which ought to be maintained. A brief account of the original author, with perhaps a portrait, would be an improvement.

Contributions to the Principles of Morphology. By W. B. CROW. London: Kegan Paul, Trench, Trübner and Co., Ltd. 1929. Pp. 94. 5*s*.

AN interesting quiet essay, approved as a thesis for the degree of D.Sc. Lond., on the general ideas underlying our conceptions of individuality, classification, and phylogeny, treated historically. It will be a useful help to orderly thought.

THE PRINCIPLES OF APPLIED ZOOLOGY.

By R. A. WARDLE, Professor of Zoology in the University of Manitoba. London: Longmans, Green and Co., Ltd. 1929. Pp. 427. With 55 text figures. 21*s*.

BY "principles" Prof. Wardle means "elements," and no one need be afraid of finding here a philosophical treatise on fundamental conceptions. The book is just an amazing mass of well-arranged facts (or near-facts) of quite unusual interest which come under the common head of relating zoology to human affairs. Part I. deals with medical and veterinary zoology—protozoa, worms, and insects in relation to disease. Part II., on agricultural and horticultural zoology, contains chapters on insect pests (as one would expect from the author, very thoroughly prepared), vermin, bird encouragement, livestock and their breeding. Most readers other than hard-pressed students will probably find the account of animal industries in Part III. the most entertaining: bees, silkworms, fisheries, whaling, and a long account of the fur industry. There is a close-printed bibliography of 27 pages. The book appeals to so many interests that it ought to be widely popular—how to avoid malaria, how to kill caterpillars, and how to choose your wife a fur coat (the synonymy of the fur trade is remarkable) are seldom described in the same volume. We congratulate Prof. Wardle on having added the best to the series of good books which he has written.

ARTIFICIAL PNEUMOTHORAX.

Essai sur le pneumothorax artificiel bilateral et simultané. By Dr. JEAN TERRASSE. Paris: Louis Arnette. 1928. Pp. 116 and plates. Fr.15.

THE number of books on collapse therapy of the tuberculous lung is legion. This book breaks no new ground; it is a short and lucid exposition of the reasons for applying the method of artificial pneumothorax, its risks, its effects on diseased and sound lung, and the complications which may ensue. Considerable space is devoted to bilateral artificial pneumothorax both by the method of collapsing one lung and later the other, and by the method of simultaneous partial collapse with small quantities of air. Oleothorax is mentioned in passing, but very little space is devoted to all the accessory operations which have now grown up around the original pneumothorax technique. There is no description of various types of apparatus. Quite half the space in the book is taken up with descriptions of cases with temperature charts, radiograms, and chest diagrams, a method of exposition which is apt to become tedious to those who have not seen the patients. The book contains a useful short bibliography. We are glad to note that the author emphasises the importance of the general hygienic treatment, with adequate periods of rest, of patients undergoing treatment by artificial pneumothorax. Without this precaution the whole benefit of the method is lost.

PRACTICAL BACTERIOLOGY.

By FRED W. TANNER, Ph.D., Professor of Bacteriology and Head of the Department, University of Illinois. New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd. 1928. Pp. 235. 12*s*. 6*d*.

THIS book is a companion volume to the author's "Bacteriology," and has been designed so as to introduce students to bacteriology as a pure science and not necessarily or solely to the examination of pathogenic micro-organisms. A course of actual laboratory classes is outlined, and the way in which it can be carried out thoroughly is indicated. The student is told the value of an intimate knowledge of his tools and descriptions follow of the microscope and how to use it; of glassware and its toilet; of the preparation of media, and of cotton-wool plugging. Most of the usual methods are adequately dealt with but fuller details of filters might have been included, and it seems a loss that the final advantage of the McIntosh-Fildes anaerobic jar was not added to the account of the Novy jars. In the section on stains no distinction is made between acid-fast and acid-alcohol-fast bacteria. Five pages are devoted to the Gram stain, yet no formula for the original method has been given. Some American modifications only have been set out, and it is noteworthy that whereas all descriptions of the original Gram expressly preclude washing with water, the methods here advocated allow it.

This practical course has been conceived on original lines and should achieve the author's purpose of widening the study of bacteria and fungi.

THE LANCET.

LONDON: SATURDAY, APRIL 6, 1929.

GASTRIC SECRETION.

THE secretion of the stomach plays an important part in human economy, and many are the functions which have been attributed to it. The gastric juice produces physical changes in the contents of the viscus, bringing them to body temperature and reducing them to a fluid or semi-fluid state suitable for passing on into the intestine; it acts chemically on many of the substances of the food, reducing native proteins to albumoses and peptones, and changing caseinogen to casein. Fat, too, is partly digested in the stomach by means of a fat-splitting ferment. Ingested food is to a certain extent sterilised by the hydrochloric acid of the juice, while the mucus poured out by the surface epithelium protects the lining membrane of the whole tract from the action of irritant substances. Gastric secretion exercises an important function in the body by influencing the acid-base equilibrium; it has even been suggested that the stomach may at times act as an excretory organ in ridding the body of toxic substances, as in hyperemesis gravidarum. Our knowledge of the gastric secretion has been obtained partly by means of experiments on animals, partly from observations on patients with gastric fistula, and more recently the stomach contents of patients have been withdrawn at intervals after giving a test-meal of varied composition, chemical analyses being made of the proceeds. The experimental methods of observing the gastric secretion in animals were initiated in 1878 by HEIDENHAIN, who artificially isolated a portion of the fundus of a dog's stomach from the rest of the organ, and were elaborated by PAVLOV and his pupils at the end of the century. PAVLOV differentiated three phases of gastric secretion in the dog. In the first phase, the sight or smell of food, or the chewing of food in the mouth even though unswallowed, led to a considerable secretion of gastric juice through the vagi nerves. A second phase occurred as the result of the chemical stimulus of partly digested foods acting on the mucous membrane of the pyloric antrum; it was thought at one time that the resultant effect on the secretory glands of the fundus of the stomach was brought about by an intragastric reflex through the intrinsic nervous plexuses of the stomach, but it is now believed that the stimulus is carried by the blood in the form of a secretory hormone, the gastric secretin first described by EDKINS. A third stage is that brought about by chemical stimuli of food products in the duodenum and small intestine; this phase, though not intense, may be long continued. The first or psychic phase is the one which specially interested PAVLOV and led him on to the remarkable researches in experimental psychology which have occupied his later years. The digestive experiments were continued, however, by his pupils and assistants, and a considerable literature has grown up on the subject, which has been dignified with the name of the science of chymology. PAVLOV's former assistants, B. P. BABKIN and E. S. LONDON, have collected the results, which show that the digestion of foods and their evacuation from the stomach are controlled by a remarkable series of secretory and motor involuntary reflexes.

Carefully devised experiments on healthy dogs, in which, by means of fistulæ, the material from gullet, stomach, duodenum, and gall-bladder can be obtained in pure state, have enabled the complicated processes of digestion to be dissected into their elements. It is found that what appear to be intricate physiological phenomena can be reduced in essence to a close approximation to simple physico-chemical laws. Given the right conditions, the stomach has the character of a test-tube, in which the course of digestion of minced meat, for example, is found to follow a logarithmic curve showing the closest approximation to a theoretical curve laid down by S. ARRHENIUS for digestive ferment action; while a starch meal solution, which is unaltered in the dog's stomach, is passed on into the duodenum at a rate conforming to a simple monomolecular formula. Moreover, the quantity of gastric secretion is proportional to the square root of the quantity of food ingested, while the duration of digestion or the length of time taken to evacuate the stomach is also proportional to the square root of the quantity of food ingested into the stomach. That is to say, the quantity of secretion and the time of digestion are found to bear a very simple quantitative relationship to the amount of food. The course of digestion for meat and fats was determined—starch is not digested in the dog's stomach—and it was found that in a mixture of foodstuffs each follows its own course of digestion, so that the digestion of milk which contains all three could be dissected into a series of separate processes affecting each of the constituents independently. A mixture of foods makes the analysis more difficult but not impracticable. In man, however, it was soon found that an analysis of the stomach contents on a mixed diet was too complicated to afford useful information, and various types of test-meal were introduced. In these a food or simple mixture of foods is given, and after a specified time or at intervals a portion or the whole of the remaining stomach contents is removed. The older test-meals of EWALD and BOAS gave useful information about the gross secretion of hydrochloric acid and pepsin, but necessarily represented the static position which the digestive process had reached in the time allowed. As the chemistry of the stomach is constantly altering, the newer methods have aimed rather at giving an estimate of the kinetics of the processes involved. The substances used in test-meals have become simpler and more indifferent, while fractional portions of the stomach contents removed at intervals afford material for analysis of a series of stages of digestion. The test-meal introduced by REHFUSS in 1914 is now used widely in the United States and in this country. In Germany preference is given to the alcohol test-meal of EHRMANN, or a plain meal of water containing pure caffein devised by KATSCH. Such simple test-meals, containing no protein or salts, are recommended because of the ease of determination of the true acidity, for this is only approximately assessed by titration methods in the presence of buffering substances like proteins and salts.

The interpretation of the test-meal results has given rise to a good deal of controversy. Considerable variations occur without being outside normal physiological limits, but certain types of result are almost characteristic of certain types of stomach. Even in a number of apparently healthy people hydrochloric acid is entirely absent throughout the digestive process; BENNETT and RYLE[1] found 4 per cent. of a series of normal people to be achlorhydric. In

[1] Guy's Hospital Reports, 1921, lxxi., 286.

others acid secretion is more active than the average. HURST, who has contributed so much to the advance of knowledge of the clinical physiology and pathology of digestion in this country, holds that in many instances these features are inherent in the make-up of the individual, and are in the nature of inborn errors of secretion.[2] According to this view, there is on the one hand a congenital over-secretion of hydrochloric acid by the stomach, a veritable gastric-ulcer diathesis; while in other cases there is a true achylia gastrica of constitutional origin. FABER[3] holds that a condition of preceding gastritis underlies both the variations in hydrochloric acid secretion and the origin of ulcer. Special importance is given to a localised gastritis of the pyloric region, which may give rise to the pyloric syndrome, involving alterations both in the acid secretion and in the emptying of the stomach. From estimating the total chlorides, inorganic chlorides, and free hydrochloric acid or active chlorides, BOLTON and GOODHART [4] came to the conclusion that the acidity was neutralised towards the end of digestion by a reflux of strongly alkaline pancreatic juice. This process of regurgitation of duodenal contents had been observed by BOLDYREFF in animals, who found that it regulates the gastric acidity and that hyperacidity is generally due to defective neutralisation. PAVLOV had observed that some neutralisation of the hydrochloric acid takes place by the mucus secreted by the stomach wall. The idea has been put forward by MACLEAN [5] that the stomach automatically regulates the hydrogen-ion concentration of its contents, and that at a stage of digestion pepsin ferment may continue to be secreted by the stomach wall in the presence of neutral chlorides. In the natural process digestion comes to a standstill by the action of extragastric inhibitory nerves. It may well be that the problems of gastric secretion and digestion in the human stomach will yield to inquiry, and that in man also time will show that the results can be stated in terms of physico-chemical laws, but much work remains to be done before this can be realised.

THE POWERS OF THE POLICE.

THE Royal Commission on Police Powers and Procedure, presided over by Lord LEE, has discharged the first duty of a Royal Commission by producing a unanimous report.[6] Points of special interest to the medical profession are few. Fatigue in witnesses was considered. There have been criticisms that the police, when taking statements, as in Miss SAVIDGE'S case, prolong the examination unduly in order to extract admissions by mere exhaustion. The Howard League of Penal Reform proposed a time limit of five hours (with an interval)—the length of a normal court session. The Royal Commission deprecates any time limit; unless fixed absurdly low, a rigid limit would be too long for some people and unnecessarily short for others; moreover, the very existence of a limit might not only lead the police to be careless in watching for signs of fatigue but might even encourage a policeman to press his questions unduly as the end of the period approached. The police, says the report, should watch the deponent for any signs of exhaustion and should offer a break (with or without refreshment) at suitable intervals, or even a postponement to the next day; nor should the witness be asked to sign a statement at the end of a long and tiring interview; ample time should be allowed for careful study before signature. A question on which members of the medical profession will be capable of forming a conclusion is whether statements from women and children in sexual cases should be taken by men or women. The Bridgeman Committee on the Employment of Policewomen recommended in 1924 that, so far as practicable, arrangements be made everywhere for the taking of such statements by policewomen. The Departmental Committee on Sexual Offences against Young Persons spoke, in 1925, of the fact that parents and teachers report offences more readily when they know that a girl will make her statement to a woman. That Committee was impressed by the general evidence that many girls suffer from shock as a result of these offences and that further distress is lessened if, in the first instance, the story is told to a woman. Lord LEE'S Commission agrees that a sufficient number of qualified and specially trained women should be made available to take statements from all young girls and children in sexual cases. The report suggests that the women thus selected need not be attested policewomen; when it goes on to say that they should be of high character, suitable temperament, good education, and adequate training, it seems to offer prospects of useful and responsible employment to women who have taken medical degrees. The Royal Commission is dissatisfied with the present compromise under which, when a suitable woman is not available, the statement is taken by a male officer in the presence of a second woman. The latter is present in part, it appears, to protect the policeman from subsequent accusation, but the Commission regards this mixed audience as being, from the point of view of the person making the statement, "the worst possible arrangement and the most embarrassing which could be devised for the narration of the details of some sexual offence." The report has a good deal more to say on the employment of policewomen, on the understaffing of the police force, on the duties of the Director of Public Prosecutions, on cautioning suspects, on agents provocateurs, and other matters. In training the police the aim should be, says the Royal Commission in a medical metaphor, the production of "general practitioners" rather than of specialists.

There are some healthy observations on the difficulties of the police, and the consequent danger to the good relations between police and public, where the police are called upon to enforce laws which are out of harmony with public opinion. These disputable offences are refreshingly summed up, and the clarification of the law is demanded. There is street betting where public opinion is tolerant and the police must expect more hindrance than help. There is the dubious law of lotteries; the local diversity of policy towards whist drives leads the Commission to suggest that the Home Office should make up its mind and issue clear instructions. There are also the offences against public decency and street offences like solicitation. Private citizens are reluctant to complain of "annoyance," and thus the cases come to be decided on police evidence alone. The defence usually involves attacking the police, and, while one section of the public complains that the policeman is too busy, another complains that he is too inactive and hints at connivances due to corruption. All the while the energies of the police are being increasingly diverted to many miscellaneous duties outside their primary function of preventing and detecting crime. They are engrossed with motor traffic and with many new offences which bring the law-abiding citizen for

[2] See THE LANCET, 1928, ii., 305.
[3] Ibid., 1927, ii., 901.
[4] Ibid., 1922, i., 420.
[5] Journal of Physiology, 1928, lxv., 63; and lxvi., 356.
[6] Cmd. 3297, 1929. Published by H.M. Stationery Office. 3s.

the first time into an unaccustomed conflict with the law and consequently cause a state of friction. The Commission finds it significant that many complaints have proved to be directed not so much against the policeman as against the laws which he has to enforce. Far the most frequent allegations of dishonesty against the police appear to concern offences which, though infringements of the law, are not popularly regarded as morally reprehensible. In criticising the excessive zeal of certain chief constables, the report has a sentence worth quoting: "In our view a grave responsibility rests on those who create criminal offences which are not precisely or clearly defined, or in respect of which the requisite evidence to support a conviction cannot be obtained by straightforward and unequivocal methods."

The Royal Commission was not empowered to take evidence on oath, so did not investigate the truth or falsity of allegations and counter-statements in particular cases, but it has made a searching examination into police administration. The English policeman emerges with his high reputation unshaken. In particular, no creditable proof has been found of the use of "third degree" methods. As an illustration of the lengths to which such methods may be carried in other lands, an appendix to the report reprints from THE LANCET [7] an article on Cross Examination under Anæsthetic, in which we recounted last year an attempt at Hawaii to extract a confession of murder by means of an injection of hyoscine.

ECONOMICS OF THE NURSE'S TRAINING.

SCIENCE cannot save lives or cure disease until it is applied, and to a large degree the application of medical science is through the art of nursing, and its ultimate success rests on the full development of this art. Some understanding of the scientific principles underlying the art of nursing is essential, and for the safety of the public the State has prescribed a minimum standard of knowledge and training before granting the title of nurse. But what is suffering at present is the art of nursing, since hospitals have now accepted the dual task of nursing the sick and educating the nurse where formerly many of them only recognised their obligation to do the former. Satisfactorily to fulfil both obligations might involve doubling the staff with a proportionate increase in administrative expenditure, a financial burden which would be unbearable under the present system. And yet both obligations must be fulfilled if hospitals are to prosper as they should, and this will mean, as Dr. E. C. HADLEY points out in a thoughtful contribution to the *Nursing Times*, the passing of the present transitional period in the history of the nursing profession. No nurse can become efficient in her art without continued practice in actual bedside nursing under skilled supervision which should never be relaxed. But the breathless rush of routine within our hospitals to-day is not consistent with any of the underlying principles of nursing and leaves practically no margin of time for organised and efficient bedside instruction. The responsibilities of a ward sister to the medical and administrative staff are too engrossing for her to fulfil her other duties as an instructor of nurses. Nor is the student nurse under the present regime in a fit state, physically and mentally, to benefit by her instruction.

And why? Her time is now occupied (we reproduce Dr. HADLEY'S list) with: cleaning, sweeping, and polishing floors in wards and adjacent rooms; scrubbing shelves, cupboards, lockers, sinks, and sluices; polishing taps and brasses; lifting beds about, not simply empty beds but often with the patient; mending and patching garments and other sewing jobs; washing up crockery, pots and pans, tea urns. But, as he remarks, the student nurse has plenty to do and to learn without doing work that belongs to a labourer or house porter, ward maid or charwoman, seamstress or domestic servant. Probationer nurses have come to do this work because their labour can be bought cheaply, although not now so cheaply as in the past. The problem of nursing education is essentially an economic one. A nurse cannot become skilled without the actual performance of services and it is for the hospital to determine fairly what those services are worth in the terms of the labour market. We think it safe to predict that when this is done the nurse will be found to be paying in service more than the equivalent of what she receives in education and training. It is manifestly unfair to the student nurse to demand from her service which does not tend to develop her skill and this is what many hospitals are doing. The solution will be found in the endowment of training schools or by adequate grants for training from the Board of Education. To educate the nurse both in the science and art of nursing should prove to be a good investment both for the public and for the medical profession, but until nurses themselves awake to the potentialities of their calling and demand the right conditions for the practice of their art, as the medical profession has done before them, the problem will remain unsolved. What these potentialities are has scarcely even been explored. The value of Dr. HADLEY'S article lies in his vivid realisation of the value to medicine of the properly trained nurse. We agree with him that her training and education merit the same care and consideration which is given to those of a medical student.

[7] THE LANCET, 1928, ii., 990.

Annotations.

"Ne quid nimis."

THE KING.

WE published in THE LANCET of March 23rd the official bulletin issued from Craigweil House on March 16th. Another bulletin was issued from the same residence in the evening of Friday, March 29th, as follows:—"His Majesty the King continues to make satisfactory progress in spite of tiresome rheumatism round the right shoulder. Weight is increasing, appetite is returning, sleep is of better quality. The insistence on a lengthy abstention from all but essential public duties and a quiet life in the present suitable climate is being justified in the steady improvement in His Majesty's bodily and mental vigour." The bulletin was signed by Sir Stanley Hewett and Lord Dawson of Penn.

THE PREVALENCE OF SPINAL IRREGULARITIES

A PAPER lately published by B. C. Cushway and R. J. Maier [1] is of considerable interest to anatomists and to surgeons, especially those engaged in industrial practice. Under the title of Routine Examination of the Spine for Industrial Employees they record their findings in the radiological examination of the spines of 931 men who applied for work as switchmen and firemen on the Belt Railroad, Chicago. These men had previously passed a rigid preliminary physical examination without any visible anatomical variations or disturbance in function being found,

[1] Jour. Amer. Med. Assoc., March 2nd, p. 693.

and none of them was aware of anything wrong with the spine. The primary object of the inquiry was medico-legal; it was intended to protect the employer from subsequent claims for compensation after injury, based upon radiographic evidence of spinal abnormality which might have existed before, and have nothing to do with the injury in question. When such a claim is made it is manifestly impossible for the expert witness to say how long the abnormality as shown on the radiogram has been present, and often he cannot decide whether it is ante- or post-traumatic. Variations from what osteologists describe as the normal anatomy of the spine are very often met with; they may affect not only the form but the number of the vertebræ. But we were not prepared to learn, as we do from this paper, that out of 931 cases as many as 414, or over 45 per cent., showed some congenital abnormality, the total number of variations from normal being 605. It is surprising to find that 81 cases of scoliosis and 13 of tuberculosis, as well as some cases of old fracture of ribs, vertebræ, and pelvis had escaped detection by the rigid preliminary physical examination. The total number of congenital and developmental anomalies recorded was 510. The commonest developmental defect was a partial failure of the two lateral halves of the column to unite in the middle line, constituting spina bifida occulta. This condition was found in 161 cases. We are not told whether in any of them there were any clinical signs of spina bifida. Proliferative changes such as arthritis or calcification of the ilio-lumbar ligament were recorded in a considerable number of cases. No statement is made of the ages of the subjects of this inquiry, but presumably some of them had reached middle age when so-called rheumatic troubles might be expected. The observations are very interesting, but their value for us is diminished by lack of data for comparison of the conditions of employment in the United States and in Great Britain. It appears, however, that just as complaints of pain in the lower back seem to be commoner in the "white collar" classes in America, so complaints of injury to the back are relatively numerous among workers in factories and railroads and the like. Be that as it may, it is clear that a record of the condition of every workman's spine at the time of his engagement must be of great value in determining claims for compensation in the event of his being injured afterwards. The taking, examining, classifying, and storing of radiograms must be an expensive business, however, and is only justifiable when workmen are engaged for more than a short time. It would be impracticable for casual labourers. The authors' statement that each individual "may be identified by a rontgenogram of the spine just as definitely as by a photograph of the face or by finger-prints" strikes us as somewhat hyperbolical in the present state of radiography, at any rate as regards ease of identification. They themselves admit that they found it very hard at first to distinguish the normal from the abnormal, largely because of uncertainty about what should be considered normal.

OPIUM IN CHILDHOOD.

OPINION is sharply divided upon the use of opium in therapeutics, and nowhere is this difference of opinion so marked as where it concerns the use of the drug in the diseases of childhood. Sydenham and, later, Charles West urged the calming properties of opium and its derivatives, but Trousseau, in particular, emphasised the dangers of the drug with his statement that in breast-fed infants half a drop of laudanum in the course of 24 hours might produce symptoms of severe narcosis. Whatever may be said on this side, opium is too valuable a drug to be lightly abandoned in pædiatric practice, and it is interesting to read a paper in which G. Blechmann and P. Delthil[1] discuss how and when it should be employed. In the first place, they remark that most of the accidents following the administration of opium have been in cases where laudanum was used, and they believe that the child is better able to tolerate the isolated alkaloids than complex preparations such as laudanum. Moreover, the condition of the child is important, and it is well known that a dose that would be poisonous to a normal child is well tolerated by the sick child who is in pain. These writers believe that most of the dangers attendant upon the use of opium in childhood can be obviated if the drug is taken freely diluted and if the dose is spread out over 24 hours. As regards the form in which it should be given, they observe that laudanum has always been popular, and if the above simple rules are observed, then a dosage of two to three drops per year of age should be considered as normal. Paregoric provides a convenient way of giving more dilute doses of the drug, and Dover's powder is regarded as an excellent preparation, especially for pulmonary disorders, where its sedative action is counterbalanced by the expectorant effect of the ipecacuanha. If morphia is to be employed it must be well diluted, and it is recommended that a 1 in 1000 solution should be used for the infant, and in this way 1·5–2·0 mg. of morphia per year of age in divided doses may be administered. (This is equivalant to approximately gr. 1/40 to 1/32. The official B.P. injection of morphia is a 1 in 40 solution of the tartrate.) Papaverine is a preparation very little used in this country, but in view of its selective action on unstriated muscle it is recommended for such conditions as asthma and whooping-cough. As to the indications for the use of opium, the severely painful colics calling for such a powerful sedative are not so common in children as in adults. Certain spasmodic conditions, however, do occur, and Blechmann and Delthil mention in particular laryngeal spasm. Injections of morphia for these troublesome conditions they consider remarkably effective, but an adequate dose must be employed. In asthma, on the other hand, they think opium should not be used in children except for the occasional exhibition of Dover's powder for troublesome catarrhal attacks. In this connexion they discuss the question of opium in diseased conditions of the respiratory system, pointing out that while the drug certainly calms an irritating cough it must be remembered that the cough may be essential if the child is to clear its inflamed bronchi. Hence the type of cough must be carefully considered, and if opium is to be used, then Dover's powder is the best form. Probably the most important uses of opium in childhood are in diseases of the alimentary system, and it is just here that opinion is so divided. Opium has a triple action on the digestive tract; it reduces peristalsis, diminishes secretion, and calms painful conditions. There are certain disorders in infancy where it is extremely valuable. A type of diarrhœa with excessive peristalsis after each meal, with attacks of colic and sometimes vomiting, due apparently to irritation of the bowel, often yields to opium and nothing else. On the other hand, in the infective diarrhœas opium is almost prohibited, at any rate during the acute stages, although later on, as diet is gradually returning to normal, opium may be very helpful in aiding the infant to regain tolerance for foodstuffs.

In summing up their views the authors of this lucid review insist that opium is too valuable a drug to fall into disuse. They emphasise that the indications for its administration must be clearly appreciated and that safety lies in diluted preparations in which the quantity needed to produce the required result is divided over several doses.

[1] Rev. de Méd., 1928, No. 8, p. 1061.

FATIGUE AND EXHAUSTION.

MUSCULAR fatigue has had much attention from physiologists and a good deal of light has been thrown on it of late. But the state of mental or "nervous" exhaustion with which all clinicians are familiar, and which many dismiss as "neurasthenia," is still for the most part unexplained. We are apt to attri-

bute states of nervous exhaustion to severe mental or emotional stress—psychic trauma—and to rely upon subjective symptoms as the sole guide to the degree of fatigue. Attempts to elicit objective signs of nervous exhaustion have met with little success, though clearly any such diagnostic measures, if reliable, must have great clinical value.

Dr. R. D. Gillespie [1] has studied the problem, in a number of patients complaining of severe and persistent fatigue, from the hypothesis that many, if not most, forms of mental illness consist in a state of fatigue and that the symptoms are signs of it. Investigation along clinical lines failed to produce any objective test which was generally applicable. Most authorities agree that the blood pressure tends to be lower and the pulse-rate higher in exhaustion than in good health, and this was the case in Gillespie's patients. The persistently low blood pressure commonly found in post-influenzal debility may be mentioned in this connexion. On the other hand, a low blood pressure and high pulse-rate cannot be regarded as a constant finding in nervous exhaustion. The "lability" of the heart is also thought to be excessive in fatigue, and the changes in pulse-rate and blood pressure when a patient stands up after being recumbent were studied by Gillespie on the basis of Schneider and Truesdell's normal figures obtained from 2000 unselected cases. In the normal there is a slight fall of pulse pressure on getting up, due to a rise of the diastolic and a fall in the systolic pressure. In the fatigued patients examined this fall was found to be almost double the normal; but the pulse-rate for the most part increased no more in the exhausted than in the normal subjects. Examination of the vital capacity, of the basal metabolic rate, and of the reaction to "autonomic" drugs gave no constant abnormality that could be classified as indicative of a state of fatigue. The red blood cell count and the hæmoglobin percentage were equally unprofitable, as is hardly surprising when we remember that many patients with severe primary anæmia are but little fatigued—their state being in striking contrast to the pronounced exhaustion often seen in secondary anæmia where the colour-index is much reduced though the actual anæmia may be far less.

Biochemical tests may offer the most hopeful line of advance, and it is significant that sugar tolerance was diminished in more than a third of Gillespie's patients. Taranowitsch [2] has noted a great increase in organic phosphorus in the urine in prolonged mental work associated with exhaustion; in one case he found nine times as much organic phosphorus in the work period as in the resting condition, though the total phosphate excretion was but little increased. This change in the ratio of organic to inorganic phosphorus excretion is the more interesting when it is remembered how important a part the phosphatides and lipoids play in nervous histology and metabolism. The significance of lactic acid in the blood and excretions is dependent rather upon muscular than upon nervous activity, and the much less intense metabolism of nervous tissue is against the likelihood of any marked changes in the output of this substance in nervous exhaustion. The rôle of the endocrine glands is one which will doubtless become clearer as research continues. The secretion of adrenalin, for example, is increased in states of exhaustion, and this substance is said to be capable experimentally of increasing the capacity of tired muscles to respond to stimuli. The work of Kühl [3] and others has suggested that the cortex of the suprarenal glands may be even more important than adrenalin in protecting the body against exhaustion, and its deficiency may be the essential factor in the extreme collapse of Addison's disease. Bast and collaborators [4] have produced nervous exhaustion in rabbits by preventing sleep and have found conspicuous changes in the suprarenals, especially in the cortex, in 13 out of 14 animals examined. Gillespie, however, does not find that insufficiency of sleep or the presence of focal infections bears more than an associative relationship to feelings of generalised fatigue. This is the more remarkable since the importance of chronic toxæmia is being more fully recognised in the ætiology of many and various pathological conditions. Gonadal hormones are also put forward by some as possibly at fault in nervous exhaustion, and the close association between sexual activities and mental depression and fatigue seems to support this possibility. That emotions—often of sexual origin—may powerfully act on bodily functions is universally recognised; we need only mention the cases of "disordered action of the heart" following war stresses, of hyperthyroidism directly resulting from shock, or the "diarrhœa of fright." Hyperglycæmia, altered coagulability of the blood, and rise of blood pressure are some of the indices that may tell of the degree and extent of emotional stimuli. How far such emotions, if excessive, may cause permanent changes that we may estimate in terms of "fatigue" is as yet unknown; but our knowledge is likely to increase rapidly through further work along biochemical lines and by the search for functional tests of endocrine activity.

[1] Gillespie, R. D.: An Investigation into the Symptoms and Signs of Fatigue and Exhaustion, Guy's Hosp. Rep., January, 1929, p. 92.

[2] Taranowitsch, L. E.: Biochem. Zeit., 1928, cxciv., 461.

[3] Kühl, G.: Klin. Woch., 1926, v., 1491.

[4] Bast, T. H., Supernaw, J. S., Liebermann, B., and Munro, J.: Amer. Jour. Physiol., 1928, lxxxv., 135.

ANOXÆMIA IN TUBERCULOSIS.

THE "traditional belief that anoxæmia is never present in pulmonary tuberculosis" has lately been criticised by I. Rappaport,[5] who says that cardiac decompensation as the result of anoxæmia is frequent in phthisis and that expectation of life in this disease depends more on the cardiac condition than on the process in the lungs. The symptoms observed in such complications as spontaneous pneumothorax and severe hæmoptysis are intimately associated, he points out, with a breakdown in the cardio-respiratory mechanism due to anoxæmia. The "anoxæmic cardiac syndrome," with its acute dyspnœa, cyanosis, and distress, is preceded by a stage of slowly progressing anoxæmia of which it is a suddenly aggravated manifestation. Left heart failure is the cause. Spontaneous pneumothorax often passes unnoticed in patients with comparatively sound lungs. When the lungs are already the seat of extensive disease with consequent chronic anoxæmia, a further and sudden reduction of oxygen throws an acute strain on the heart; hence the acute distress. Severe pulmonary hæmorrhage is the commonest cause of acute left heart failure due to anoxæmia. Similarly chronic phthisis frequently presents evidence of a chronic anoxæmic cardiac syndrome manifested by dyspnœa and palpitation. Rappaport says that digitalis, by slowing the heart-rate, may prevent the exhaustion of the compensatory mechanism while morphia, a respiratory depressant, can only do harm. The latter is especially contra-indicated, in his opinion, when spontaneous pneumothorax has occurred.

[5] Amer. Rev. of Tuberc., 1928, xviii., 447.

THE INFANCY OF MIDWIFERY.

IN surveying the advances of medical science during the last few hundred years it is impossible to avoid the reflection that many of them are a response to the ills brought by civilisation. One is tempted to include obstetrics in this category, for among primitive peoples childbearing is often so easy as hardly to disturb the mother's working life. Travellers in Africa have reported that Nigerian women, making the pilgrimage to Mecca on foot, will step aside into the forest, give birth to a child, and rejoin the column before the tail of it has passed, their baby slung

behind them in the slack of their shawl. The Bedouins afford an example which is at first sight contrary. "The nomad hareem," says Doughty, "are delivered as other mothers, with pangs, after a labour of certain hours. It is a fond opinion that the daughters of the desert are as the wild creatures, that suffer not in childbearing."[1] But the life of Bedouin tribes, outside the imaginings of novelists, is mainly one of under-nutrition, of sloth, and herein perhaps lies the explanation. No advantage is apparent for the pains of childbirth unless they were devised as a warning to seek for cover and quiet that the child may be safely born; and such a warning obviously grows less and less valuable as mankind forsakes the savage life for the slack and sedentary existence of Arab tents and European houses. Yet it seems that the pains of labour have developed only as their use from the evolutionary standpoint became negligible, and we are forced to the conclusion that they are not an inherited burden that once had a "survival value," but rather a penalty incurred by woman when she forsook the outdoor life for the home. Thus it is that historians find little development in obstetrics until the days when town life imposed on women a sedentary and presumably unsuitable existence. Dr. D. G. Madill, whose address on this subject to the Dublin University Biological Society appears in the *Irish Journal of Medical Science* for February, says that one of the first inventions to assist labour was the birth-stool, a horseshoe-shaped seat on four legs with a sloping back. This has been employed in all ages among peoples with some civilisation, and is still in use in the Near East. Dr. Madill thinks that this contrivance marks the transition from an active to a passive attitude in the mother, for many primitive tribes employ devices to enable the parturient woman to bring the maximum voluntary pressure to bear. Hadendoa women, in the Eastern Sudan, stand up and grasp the branch of a tree over their heads; among the Shuli negroes, according to Felkin, the mothers sit on a block with their back to a tree and grasp two upright stakes, fitted with footrests about 18 inches from the ground. Dr. Madill traces the beginnings of obstetrical science among cultivators as opposed to nomads, whom he seems to regard as healthy and active. Erylemana, he says, reports that the North American Indians have their own midwives, and many other peoples hand down obstetrical customs from generation to generation. The earliest of these consist of pressure and kneading of the abdomen, but the midwives of the Pueblos and Indian-born Mexicans along the Pacific coast carry out examinations per vaginam. There is very little record of the extent of obstetrical knowledge in ancient civilisations, and the first details that Dr. Madill quotes are from Greece. Plato remarks that two classes of midwives existed, the higher of which were empowered to administer remedies like medical men and to recite certain hymns during the labour. Herophilus, who lived in Alexandria in the fourth and third centuries B.C., knew how to diagnose pregnancy from the condition of the cervix, and how to distinguish fœtal movements; he instructed women in obstetrics in contravention of the Attic Law, and started the movement which ended in its repeal. Nearly all the midwives in Rome were Greeks, and Soranus (A.D. 100) lays down rules for their qualification, but during the later Roman Empire, according to Dr. Madill, midwifery began to evolve some of the principles which apply to-day. Moschion gave exact details for the artificial rupture of the membranes, and directed that the os should be fully dilated at the onset. Midwives of his day assisted the passage of the placenta by attaching a weight to the cord and making the patient sneeze. Soranus, the foremost obstetrician of the old world, knew of the reposition of prolapsed parts, of artificial dilatation and of craniotomy, and Paulus Aeginatus used a uterine speculum. In the Middle Ages obstetrics had definitely become a science, and many of the forceps, cranitomes, and other instruments exhibited in the Wellcome Museum are almost as effective as those used to-day. The municipality of Freiburg, in Germany, employed four salaried midwives in 1485, and Basle had a school of obstetrical instruction in 1498. In conclusion, Dr. Madill mentions the interesting fact that the Cæsarean section, which from being practised in ancient days fell into disuse among the Romans, was revived by the Christian doctrine of the necessity of baptism as the only barrier to eternal damnation. The earliest record of its performance upon a living woman dates, he says, from 1610, so that its use as a means of saving the mother marks a much later period of enlightenment.

[1] Doughty, C. M.: Arabia Deserta. London: 1926 edition, vol. i., p. 239.

SUPERSENSITIVENESS TO INSULIN.

INSULIN has been but little used in England except in the treatment of diabetes mellitus, but on the Continent it is employed somewhat extensively in other conditions, notably as a *Mastkur* designed to hasten convalescence and increase weight. W. Falta has shown that at least some forms of obesity are probably the result of over-activity of the islets of Langerhans, and there is no doubt that nutrition may often be rapidly improved by artificially increasing the supply of insulin by means of injections, especially when these are associated with administration of glucose. The response to insulin, as measured by estimations of blood-sugar or by the clinical symptoms, is variable in different subjects and in different conditions. In diabetes associated with high blood pressure, or severe cardiac lesions, there is a definite risk of untoward events if dosage is not watched with great care, and fatal collapse may sometimes be caused by amounts that would provoke no such response in an ordinary diabetic. A remarkable sensitiveness is also sometimes apparent when phthisis complicates diabetes, and this may possibly be due to mild protein shock—to which tuberculous patients are especially susceptible—caused by very slight traces of protein present in the injection. In diseases of the liver, such as cirrhosis, very small doses of insulin may produce hypoglycæmia, a fact which is explicable on the assumption that its administration checks the already defective output of sugar from the liver into the blood. This may also account for the supersensitiveness seen in decompensated cardiac cases in which the hepatic function is seriously deranged. In exophthalmic goitre many attempts have been made to prevent the excessive loss of weight by giving insulin and carbohydrate, and very favourable results upon these lines have been reported. It has been thought that hyperthyroidism tends to lessen the activity of insulin, and a much increased sensitiveness to the drug has often been recorded in myxœdema. The extreme resistance to insulin when toxæmia or sepsis is added to diabetes has been attributed to stimulation of the thyroid by septic products, and the glycosuria often found in exophthalmic goitre—especially when this is of toxic origin—is well known. Much experimental work has shown that the thyroid and pancreas are, in fact, antagonistic, and the practical importance of this has led E. Adler [1] to investigate the sensitiveness of patients suffering from hyperthyroidism to small doses of insulin. He has studied the effect of a subcutaneous injection of 5 units upon the blood-sugar in the fasting condition, and has found no apparent difference between the patients examined and a series of normal subjects; nor could any alteration in sensitiveness be noted in relation to the basal metabolic rate or to the severity of the disease as a whole. No increased sensitiveness was obvious as the patient's condition improved, nor could a parallelism be traced between any one symptom and sensitiveness to insulin. These results may set at rest any fears of undue reaction from the use of insulin in Graves's disease, but unfortunately they

[1] Adler, E.: Hyperthyreosen und Insulinempfindlichkeit, Wien. Arch. f. Inn. Med., 1929, xvi., 343.

throw no light upon the fundamental metabolic disturbances of this disorder. This is further evidence of the unhappy truth that insulin has so far done little to reveal the essential pathology of the endocrine organs.

CANCER AND TUBERCULOSIS.

IT has often been suggested that there is an interrelationship between the incidence of cancer and of tuberculosis. Three years ago Dr. Thomas Cherry, of Melbourne, published in our columns [1] the results of a statistical investigation from which he concluded that the incidence of cancer increased as that of tuberculosis diminished, and only a fortnight ago [2] we were able to summarise some remarkable observations by Prof. Raymond Pearl, who found that an organism suffering from active tuberculosis is less often the seat of malignant disease than an organism suffering from other diseases, and, conversely, that tuberculous lesions rarely occur in persons suffering from malignant disease. Dr. Cherry's work has been carried a stage further by extensive experiment on mice.[3] About 100 animals of a given stock were inoculated intracutaneously with tubercle bacilli in small measured doses. Mice are very resistant to tubercle bacilli and the doses given did not produce active tuberculous lesions. A careful post-mortem examination, both macroscopic and microscopic, was made when the animals died, and the results were compared with the cause of death in about 150 control mice of the same stock. A large percentage of the mice, both in the inoculated and in one of the control series, developed lesions in the lymphoid system, such as enlarged lymph glands, lymphoid infiltration of various organs, an enlarged spleen, or a leukæmic blood picture, in various combinations. These lesions are described in considerable detail, and Dr. Cherry seems to attach a degree of importance to them. A disturbing fact which makes the interpretation of the results difficult is that the incidence of these conditions was as high in one of the control batches which had received raw milk in their diet as it was in the inoculated batches. It was much lower in the second control batch which received boiled milk instead of raw milk, and the difference is very naturally attributed to an infection carried by the raw milk. The author seems to incline to the view that these conditions are manifestations of malignancy. That is a view which is open to doubt. Besides these conditions a number of typical malignant new growths were found and the significant fact is that the number was much higher in the inoculated series than in the controls. In the former group six tumours are described as sarcomata—either spindle-celled or mixed-celled—of which two arose at the point of inoculation while the other four were remote from it (abdomen, hind-foot). If the diagnosis is correct the percentage incidence is an abnormally high one, since sarcomata are rare in mice, and no sarcomata were found in the 100 control mice receiving boiled milk. The incidence of carcinomata is even higher, and cases include not only the usual type of neoplasms in the mouse (carcinoma of the mamma and of the leg) but also such unusual examples as carcinomas of the pancreas and of the colon. Although the true malignant nature of some of the tumours does not seem to be fully established either by the description or by the figures accompanying the paper, the experimental evidence submitted establishes a strong case in support of the contention that the experimental inoculation raised the frequency of spontaneous malignant new growths. Dr. Cherry states very clearly that he does not interpret his results as demonstrating a direct specific causal nexus between the tubercle bacillus and malignancy. The relationship is an indirect one. The tubercle bacillus is only one of the many carcinogenic agents such as tar, X rays, Fibiger's spiroptera, which, though very diverse in their nature, induce by their continued action the condition of malignancy. The period of induction with these various agencies is very long and this seems to hold good also for the true neoplasms arising in the inoculated mice, although the data are not always clearly given.

The results of this careful and laborious investigation require confirmation, for the validity of Dr. Cherry's contention depends on his pathological diagnosis of the truly malignant nature of the tumours which developed in his experimental animals. On this point we feel that he has weakened rather than strengthened his case by including conditions of doubtful malignancy.

[1] THE LANCET, 1925, ii., 644.
[2] Ibid., March 23rd, 1929, p. 632.
[3] Med. Jour. Australia, Feb. 9th, 1929, p. 160.

GALLOP RHYTHM.

THE *bruit de galop* and the corresponding phenomena which can be recognised on palpation have long been regarded by clinicians as signs of ill-omen, and the theories which have been put forward about the mechanism of their production are many and varied. These signs are most often found in cases of chronic nephritis with high blood pressure, and their appearance is generally taken to signify that the heart is failing. Two types of gallop rhythm have been described, the distinction between them depending on whether the additional sound occurs early or late in diastole. In the one case the second, and in the other the first heart sound appears to be reduplicated. Most writers who have attempted to probe the mystery of this peculiar sign have taken as their guide a tracing of the cardiac impulse; but owing to its variability the cardiogram has proved little better than a broken reed to those who have leant upon it. A safer clue has been followed up by H. Mond and E. T. Oppenheimer,[1] who have made a series of synchronous records of the heart sounds and electrocardiograms. Their records show that the supernumerary heart sound of gallop rhythm always corresponds in time to auricular systole, and they point out that it disappears when the auricles fibrillate. Its position in the cardiac cycle may be early, mid, or late diastole. When the heart is beating rapidly diastole is short and the contraction of the auricle, with its accompanying gallop sound, follows close on the heels of ventricular systole. During bradycardia, on the other hand, there is a long silent interval between the second heart sound which marks the end of ventricular systole and the succeeding auricular cycle. Under these circumstances the gallop is presystolic in time. And, lastly, when bradycardia is associated with delayed conduction, auricular systole and the third heart sound may occur in mid-diastole. Mond and Oppenheimer believe that the lax walls of the empty ventricle normally damp out the sounds produced by auricular systole, but that in the failing heart, when the diastolic tension of the ventricular wall is increased, the acoustic conditions are completely changed. The ventricle then behaves as a resonator and amplifies the sounds produced by the contracting auricle. This hypothesis is certainly attractive. It affords an explanation of the association between gallop rhythm and congestive heart failure in cases of high blood pressure, and harmonises with the other known facts.

PATHOLOGY OF PYORRHŒA ALVEOLARIS.

AN addition of considerable value has been made to our knowledge of the morbid anatomy of pyorrhœa alveolaris by the work of Mr. Warwick James and Mr. A. Counsell [2] carried out in the Bland-Sutton Institute of Pathology at the Middlesex Hospital. The earliest changes occur in the subgingival epithelium of the gum, just below its junction with the periodontal membrane of the tooth which thickens and sends out finger-like

[1] Arch. Internal Med., February, 1929, p. 166.
[2] Histological Investigation into "So-called Pyorrhœa Alveolaris," Brit. Dent. Jour., 1927, xlviii., 1237; The Primary Lesion in So-called Pyorrhœa, ibid., 1928, xlix.

processes into the corium. As the condition advances the epithelium grows downwards along the cement of the root and becomes attached to the latter by means of a layer of keratinised material. This is in accordance with the findings of other observers, notably H. Box and B. Gottlieb. Associated with these proliferative changes there is desquamation of the superficial epithelium in the direction of the root, forming a pocket which tends to deepen and widen. The downgrowth of epithelium along the root of the tooth is, however, in advance of the destruction, so that ulceration does not occur. So far from the pocket being lined with granulation tissue, as has been frequently stated, it is always covered by epithelium which being of new formation differs from that normally lining the gingival trough. As may be seen in carefully prepared sections, tartar is deposited upon the keratinised epithelium adherent to the cement and fills the pocket. It would appear that the lesions usually commence between the teeth and thence extend laterally. The circular ligament, which is the name given to the junction of the gum corium with the periodontal membrane, is destroyed but is reformed at a lower level concurrently with the extension of the lesions in the epithelium; its fibres, however, are less regularly arranged than in the normal state. In advanced cases the fibrous tissue may be replaced by a cellular infiltration of the plasma type and much of the support of the tooth is lost. Definite changes appear in the blood-vessels, the walls of the arteries being thickened and the veins dilated. The cytological changes are instructive. In the early stages of the disease there is an infiltration of lymphocytes into the subgingival epithelium which remains localised. In later stages plasma cells are present round the vessels; thence they extend in diffuse masses along the perivascular channels into the medullary cavities of the bone leading to the destruction of the latter tissue. In this way there is a direct path of infection from the gum margin to the interior of the bone—a point of some importance in its bearing on the problem of focal infection. There has been a tendency to assume that the open sepsis of pyorrhœa which discharges its toxins into the mouth is relatively less serious than the closed type of apical infection in which the only escape of toxins is into the blood stream. It is doubtful if this distinction holds good, for while some of the toxins in pyorrhœa may pass into the mouth and be swallowed, yet there appears to be an abundant opportunity for infected matter to be absorbed into the blood stream by means of the vessels in the alveolar bone. Polymorphonuclear leucocytes are relatively uncommon; when present they would seem to be due to a pyogenic infection superimposed on the original lesion. In spite of the implication of the word pyorrhœa the presence of pus is uncommon.

While it has usually been thought that the lesions in the periodontal membrane were of great importance, James and Counsell find that this structure is the last to be involved. They describe histological changes in the membrane which resemble those described by Box under the name of "rarefying pericementitis fibrosa." The bony changes consist of a progressive marginal absorption of the lacunar variety. Loss by halisteresis as described by N. Znamensky was not observed. Where the loss of bone has opened up the medullary cavities the bone-marrow undergoes changes and in due course becomes replaced by fine fibrillar connective tissue and plasma cells. The chief points of interest which emerge from these investigations are that pyorrhœa is essentially a gingivitis in its early stage, which is characterised by epithelial proliferation along the root, leading to the formation of a pocket which is always lined with epithelium. There is a progressive destruction of bone accompanied by fibrotic changes in the gum corium. The periodontal membrane is the last tissue to be attacked so that the disease is incorrectly termed a general periodontitis. The presence of pus is uncommon and when it exists is due to a secondary pyogenic infection. An infiltration with plasma cells is a constant feature and plays an important part in the spread of the disease. The various changes described are illustrated by a remarkable series of microphotographs and add much to the value of the papers.

OCCUPATIONAL SILICOSIS.

SILICOSIS is now receiving more attention than any other occupational disease, its prevalence having been grasped almost suddenly. Allied with tuberculosis it forms the most fatal and most preventable group of phthisis cases, and its occupational origin is being recognised in the granting of compensation to the victims. During the last 12 months the provisions of the Compensation Act in this respect have been extended to the grinding of metals, to the potteries, to tin-mining, to various other industries in which there is a silica dust risk, and now since April 1st to the sandstone industry. Without doubt through claims arising and medical supervision of those employed, more accurate and valuable information on the incidence of the disease will become available. Similar action is being taken in the Dominions—on the Rand, in Ontario, in New South Wales, and in Western Australia. European continental countries have so far held back, but the subject has had the premier place this week at Lyons in the International Congress on Occupational Diseases. The United States, too, are fully alive to the new knowledge; and a valuable report of a special committee has just been issued[1] on the silica hazard of men employed in building and tunnelling the Manhatton schist upon which New York is built. Over 200 men taken from work were carefully examined, with X rays and otherwise, and 57 per cent. of them showed signs of silicosis, 15 per cent. being in a fairly advanced stage. This certainly seems to justify the conclusion that silicosis is a serious hazard to rock drillers, blasters, and excavators in New York City. Study of the dust showed that both in silica content and in number and size of particles it was dangerous to health; the free silica content was from 1 per cent. to 84 per cent., and sampling showed the amount in the air generated by the pneumatic drills to be of the same order as is found in metalliferous mining. The committee have good ground for recommending that compensation should be granted by law for disability due to silicosis. Such an economic liability is bound to incite preventive measures. Simultaneously there reach us from New South Wales two Government studies, one into dust sampling in sandstone industries,[2] the other into pneumonokonioses produced by diverse mineral dusts.[3] Building on and with, and tunnelling through, sandstone at Sydney presents a problem similar to that of New York. The stone is composed of 86 to 95 per cent. quartz grains, and, when worked with machine drills, gives off a plentiful supply of fine injurious dust. The dust studies, in which the Owens's jet dust counter and the Greenburg-Smith impinger were used, are of great interest. They indicate that if each dust particle initiates a fibrotic condition, the 1-micron particle is the most dangerous, because it is in majority; if fibrosis depends on solubility of dust particles in the lungs, the 2-micron is the most pernicious, as it exposes the greatest percentage of surface; whilst, if quantity is the most important factor, the 3-micron is most pernicious, as it is heaviest. If number, surface, and weight are all factors, then sizes 1–3 are the worst. Of not less interest is the study in which from exposure to dust of orthobase basalt, of certain coals, of oxide of iron, of asbestos, and of cement, evidence is adduced to prove the production of a fine type of pulmonary fibrosis, as distinct from silicosis. People with this type of fibrosis do not seem to be especially liable to tuberculosis, although other pulmonary diseases concern them. A whole new group of pulmonary fibroses is here under observation.

[1] Jour. Indust. Hyg., Feb., 1929, p. 37.
[2] Study in Industrial Hygiene, No. 12, Report of Dir.-Gen. of Public Health, New South Wales, for 1927. Sydney, 1929.
[3] Study No. 13.: Ibid.

BLOOD PRESSURE AND DISEASE.

ALMOST every medical discussion nowadays shows the reversion of medical thought towards diatheses and types of constitution. The one on blood pressure at the Hunterian Society on March 25th proved no exception. Dr. Halls Dally, the opener, while enunciating his belief that the problem could only be rationalised from the biological standpoint, nevertheless ventured to lay down a certain standard of blood pressure in relation to age. Physiologically, he said, the physician might expect to find a blood pressure of 80/50 in a child of 5, of 100/50 in a child of 10, and a sharp rise with the onset of gonadal function at puberty to 120/75, while between the ages of 17 and 40 a man might be expected to show a reading of 125/80, and a woman of 115/75, both sexes rising slowly up to 135/88 at the age of 60. For venturing to give even this rough guide, however, Dr. Halls Dally was severely criticised by subsequent speakers. Dr. Campbell McClure declared that he had no interest whatever in an "average" blood pressure. Dr. Temple Gray averred that no statement had done more harm in medicine than the dictum, "A man is as old as his arteries." Some men would live to a ripe old age with arteries in an apparently hopeless condition; others would die young with apparently healthy vessels. He had seen men very ill with nephritis with a blood pressure of 85, and had known a man walking about with a blood pressure of 360. Dr. Temple Gray also pointed out that Kretschmer's four psycho-physiological types showed distinct differences in their blood-pressure levels, and Dr. McClure drew a vivid picture of the two constitutions, the high and low blood-pressure types. The person of the low-pressure type was an unsatisfactory child at school. He might have artistic talent, but he could not shine at intellectual work. He suffered from lassitude, headaches, insomnia, and evening fatigue. He was seen by the doctor in early manhood, but seldom when he was over 50. Slow to develop, he was rarely able to put his abilities on the market before he was 40, but by the time he was 60 he had far outdistanced his high blood-pressure rival, who had shot ahead at school with exuberant vitality, carried off all the prizes in his early professional career, and died intellectually at 38. The high-pressure type came to the doctor much later in life, and suffered from many disorders of cardiac and renal function to which the low-pressure man was a stranger. The latter has, Dr. McClure thought, to beware chiefly of early cancer, which is apt to hit him before he has time to react to the environment of ageing. There is a certain structural difference between the two types which is revealed in the shape of the heart. The low blood pressure type has a tubular heart, is always short of calcium, and is liable to tuberculosis; the high blood pressure type has the "bullock-heart," is always full of calcium, and has difficulty in elimination. If he contracts tuberculosis, he recovers. Dr. Halls Dally pointed out the peculiar resemblance between the symptoms of high and low blood pressure, and described them as expressions of two opposite forms of failure to adapt to the environment. Nevertheless, there must always remain a certain number of patients in whom abnormal blood pressure, as a direct measure of the load the heart and valves have to bear, and of the vasomotor tone, calls for therapeutic measures. The decision to treat should never be based on simple systolic readings alone. The diastolic, the differential, and probably in future the arteriolar and capillary pressures, will all prove of great significance.

WE regret to announce the death on April 1st, at Hove, of Dr. Robert Lauder Mackenzie Wallis, lecturer in chemical pathology at the University of London, and formerly chemical pathologist at St. Bartholomew's Hospital. He was in his forty-fourth year.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

CCXCI.—THE TREATMENT OF VULVAR AND ANAL ECZEMA.

PART II.*

X Ray Treatment.

IN the past it has often been claimed that X rays are the best treatment for these cases of pruritus and eczema of the ano-genital region. X ray treatment used to be my chief therapeutic agent, but now I regard it as no more than an aid. I would thus summarise my conclusions:—

1. When treating a severe, chronic case one correct dose of X ray is of great value, often causing a marked step forward in the progress whilst other treatment is continued.

2. After trial of many doses, I have found that the method which has given most satisfactory results is one dose, given thus: H.2 unfiltered, and H.2 or H.3 filtered through ½ mm. aluminium. The pastille is placed on the skin. I use the Hampson tintometer and Sabouraud pastilles obtained from Paris.

3. X rays do not alone bring about a cure.

4. X rays are probably unnecessary for mild non-œdematous cases; these often respond to simpler measures.

5. One full pastille dose of X ray, even if filtered through ½ mm. aluminium, can be followed by telangiectases. With the milder tubes of pre-war years these did not appear for several years. Nowadays, with the higher voltages employed, the same dose is soon followed by pigmentation and often by telangiectases within a year.

6. When relapse has occurred, even if long after several small doses of X rays had been given at intervals, the administration of one suitable dose does not cause the usual benefit. This resistance to repeated X ray dosage has been noted by many observers in the case of rodent ulcer and other dermatoses.

The following case shows how little X rays alone can do for a severe form of this malady:—

Mrs. P., aged 34, in June, 1919, had tried many remedies and had been under the care of two dermatologists for fissured and œdematous eczema of the vulva and anus. She had become a tearful wreck from lack of sleep. She was given the usual calamine with carbolic lotions, and mercurial and cocaine ointments. Just under one pastille dose of X ray was administered by the method above described. As the nervous system was so undermined she could not be expected to refrain from scratching, and hence it was impossible to treat her whilst at work. She was put to bed; all the diseased region was painted with pure carbolic acid. This was followed by fomentations with 1 in 40 carbolic, changed every two or three hours. The parts were kept thus so raw and sore that she could not scratch, and the habit was broken whilst sleep was obtained. When the outer layer of mucous membrane and skin had healed she had carron oil, calamine cream, and daily high-frequency treatment to both vulva and anus. Then the vaginal discharge was dealt with. When she was seen after the August holiday she was almost well. In September a 2 3 divided X ray dose was given. She became completely cured and had remained without the slightest relapse when I heard from her in 1926.

High Frequency.

Again one must take into account the difference of modern instruments and those of former days. Low tension diathermy is used to-day. In pre-war days the vacuum tubes were attached to the Oudin resonator of the high voltage high-frequency machine. The tubes of the older machine convey an entirely different sensation to the patient; they are less warm, but more stinging; moreover, especially when combined with the condenser couch, they aid the general health of the patient. When I speak of high-frequency vacuum electrodes I mean the tonic dose obtained from

---

*Part I. appeared last week.

a Dean instrument with noisy spark gap in glass container, manufactured in 1906. From time to time all wiring has been replaced, and the Leyden jars have given place to condenser plates in oil. No diathermy tube which I have tried conveys anything like the brilliant invigorating sensation of the older instrument. Treatment by the vacuum tube is especially indicated when there is much swelling; this is appreciably reduced during the sitting of 15 to 20 minutes. I use a tube specially made, large enough to fit over the entire vulva. This is pressed upon the part and held in close contact; it is applied daily for 6 to 12 days. Many a patient whose suffering was so great that no local application alleviated the irritation enough to prevent uncontrollable night scratching has remarked that improvement dated from the first application of the high-frequency tube. The general tonic effect is also most helpful in neurasthenic and toxæmic cases.

Miss A., aged 59, seen in 1925 with extensive eczema of the vulva and anus. There was a slight vaginal discharge. She had suffered for 15 years and tried many remedies. She made great improvement within a week after one X ray and light twice a week, and the usual mercurial ointment and protective care. But she spontaneously remarked that the first great relief from irritation followed the first high-frequency application. She was practically cured within five weeks and remained so when I last heard in 1927.

Ionisation.

In some cases I have given zinc ionisation. Fissures are cured by 1 or 2 m.a. for 4–8 minutes. When ionisation is given over a larger area it has the drawback that the initial increase of irritation causes patients to lose confidence. The value of ionisation to the cervix with zinc or copper has at long last been recognised as a most beneficial method of treatment of discharge. A relapse of pruritus and eczema is often found to be due to a renewed discharge.

Miss N., aged 44, seen in May, 1913, had had severe vulvar eczema for six years. She was put to bed and the parts painted with pure carbolic acid. In these days I had not realised the causal importance of a slight vaginal discharge. For the time she was cured but relapsed in July and again in September. Then at last I treated the discharge, giving copper and zinc ionisation to the cervix. She became cured and remained so when I last heard from her in 1926, when she came to see me.

Ultra-violet Light.

Of recent years this method of treatment has received enthusiastic supporters. Details of the types of case treated are singularly lacking in most of the published reports. What other form of treatment is employed—ointments, lotions, powders, protective or general hygiene—is scarcely if ever mentioned by those who acclaim the value of ultra-violet light as a panacea for this distressing malady. I tried the tungsten arc and the mercury-vapour lamp, and have formed the opinion that ultra-violet light is certainly a useful adjunct to other treatment; I have never relied upon it alone. It seems more beneficial in treatment of the vulva than of the anus, but it has not been in use long enough to compare its value with other methods. Many patients have remarked that the tungsten arc was more beneficial than the mercury-vapour lamp. I became convinced of the value of true sunlight by its effect on two women who could not stay in London long enough to have more than a few days' preliminary treatment. Both had profuse muco-purulent discharge from the womb, so irritating that the entrance of the vagina, as well as the labiæ, was swollen and tender. The usual X ray dose was given, ionisation to the cervix, and careful directions as to douching and guarding the infected areas from the discharge. The patients went, one to the Riviera, one to the South of England. They exposed the parts to the direct rays of the cool morning sun for half to one hour respectively. Both became cured and both attributed high value to the sunshine.

A word of caution must here be given concerning the application of X ray and ultra-violet light on the same day. If as much as 4/5 of a pastille, even if filtered for half time, is followed by tungsten arc, concentrated, 1 minute at 12 inches, acute erythema and swelling follow. This is intensely irritating and painful for over a week and alarms the patient. On the other hand, it brings about a rapid cure. I learned the danger of X ray and ultra-violet at the same sitting by my experience with four cases. I had treated an extensive eczema in a diabetic patient by this method, hoping to hasten matters before I left for a holiday. Later, she told me she had suffered greatly, but the subsequent cure had been miraculous in its rapidity and completeness. Three other severe cases reported similarly. Two were so grateful that they did not mind the early reaction; the other, however, never forgave the suffering; so I have not dared to repeat this method.

Local Applications.

The recommended creams, ointments, and lotions are legion. For times of urgency, when irritation is unbearable, menthol (grs. iv.–℥i.) relieves, but gives rise to much pain when cracks are present. Cocaine 2 per cent., or butyn 5 per cent., in lotion or cream, are very useful; so also are 1 or 2 per cent. solutions of creolin or carbolic acid. Some find a saturated solution of boric acid the best application. It comforts the patient to be warned of the fact that different applications suit at different stages of the disease, even at different times of the day; so changes must be rung. When the patient can go to bed and have the advantage of skilled nursing, many now rely upon coal-tar. When there is thickened leathery induration and the patient can lie up, painting with pure carbolic acid, followed by compresses of 1 in 40 carbolic, soon causes exfoliation. Diathermy sparking brings about the same effect. The mucous membrane is then protected by some soothing cream, or carron oil will answer when the mildest powder in a cream causes discomfort. Many patients cannot lie up for longer than a few days. The mercurial preparations answer in most cases: hyd. ox. flav. gr. i. to ℥i. of paraff. moll., calomel grs. xx., zinc oxide ℥i., paraff. moll. ℥i. Lassar's paste, or a calamine cream with 1 per cent. carbolic acid, suits others better. When the parts are no longer swollen and cracked, a dry dusting powder, equal parts of talc, bismuth oxychloride, and zinc oxide, with a little boric acid, is an excellent application for use by day.

Before 1910 very little was done for these cases except the application of cocaine ointment 2 per cent., and painting weekly with silver nitrate grs. xvi. in spt. etheris nitrosi ℥i. As a result of ignorance of the origin of the eruption, no care used to be taken to remove sources of infection of the skin and mucous membrane. The urine, we used to be taught, was a bland fluid which could not irritate the skin. Again, all women were supposed to have, from time to time, more or less vaginal discharge; hence one of the chief sources of infection of the vulva was not dealt with. Patients used to be told, even by dermatologists, that the condition was incurable, or "a neurosis"; and only palliative treatment was given, consisting for the most part of cocaine, silver nitrate, mild tar, or mercurial ointments and bathing with boric lotion. All of these are valuable, and are still used to-day.

A Few Failures.

It is always instructive to consider one's failures. Before the war, undoubtedly many relapses of my cases of vulvar eczema were caused by unrecognised slight vaginal discharge. Many of the relapses of pruritus and eczema ani, as I have already said, were due, I at last realised, to paraffin leakage. Again and again, when such patients came to me with a relapse, I would find tinges of fæcal matter between the anal ridges. Other unrecognised causes of relapse were possibly due to the fungus described by Castellani.

Notes of two cases of comparative failure are given below:—

Miss J., aged 47, who said she had had eczema on and off all her life, was first seen in May, 1917, with severe eczema

of anus and vulva. She was a delicate woman of the thin, sallow, nervous type. She had had six X ray weekly doses from a physician skilled in X ray treatment, but had not received the slightest benefit. Her case provided another proof that X ray is only an adjunct to the correct management of these cases, and cannot alone cure the condition. At that time I relied on a mild antiseptic ointment, and the dosage of X ray I had found to be most efficacious. The result was successful at first, in spite of the fact that previous X ray dosage told against a good prognosis. But she relapsed in 1919; and again in 1922, though not severely. She was only able to stay in London a day or two at a time, and so no continuous observation or treatment was possible. Eventually she wrote she was greatly improved but subject to a mild degree of periodical recurrence of her old trouble. This case failed because of the obstinacy of a condition which had had too many doses of X ray and because of the defective diet and lack of exercise taken by an impoverished and unoccupied woman with few interests in life.

Miss S., aged 45, was sent to me last year with vulvar eczema dating from the age of 17. She was of poor mentality and physique, with a lengthy history of illnesses—including Graves's disease and colitis. Again and again in this case, just when success seemed assured, the parts would swell up and progress would be retarded for many weeks. At length her companion told me that although scratching was denied, in reality the sufferer often indulged in a truly alarming orgy of it. After trying everything, she was sent to hospital where the surgeon excised the parts. This failure was due to time in a home being limited, owing to financial reasons, and also to the fact that it was impossible to break off her habit of scratching.

Examples of Successful Cases.

Two difficult successful cases, illustrative of types in which the disease was due to different causes, may also be of interest.

In 1918 I saw Miss E., one of the most widespread cases I have ever seen in a young woman of 28. She had become very neurotic from lack of sleep, due to the incessant irritation and worry which had existed despite a variety of treatment and the doctors for over three years. Both vulva and anus were swollen and eczematous. There was a prolonged history of constipation, and apparently she had suffered from true colitis some years previously. No doubt the mucus which exudes in these cases had infected the skin with streptococci and started the chronic eczema. She caused me much anxiety, as in her sleepless nervous state it was exceedingly difficult to make her abstain from scratching. Indeed, the sole successful method was the application of a stinging lotion containing menthol and spirit, which caused soreness long enough to break the habit. Sleeping draughts carried her over the early days until the X ray and daily high-frequency applications reduced the irritation enough for her to be able to coöperate loyally in the progress towards the cure which occurred after two months. When I heard from her four years later she had had no recurrence.

Mrs. T., aged 56, first seen in March, 1926, had suffered from pruritus and eczema of vulva and anus on and off since the menopause. All the time she had had treatment of all kinds, local and general, from several most careful physicians. In autumn, 1924, she had had 6 ¼ pastille doses filtered through 1 mm. aluminium. In spring, 1925, she had had 10 almost weekly doses of X ray 1 3 and ½ pastille, three not filtered, the others filtered through ½ and 1 mm. aluminium. The patient was athyroidic, with blue upper arms and breasts, and much abdominal distension. When she was sent to me, she had a severe recurrence of eczema, extending to anus and intergluteal fold. The only causal history I could obtain was that two years previously she had noted intense irritation coincided with vaginal discharge. This led me to decide to treat the uterine discharge. A course of ionisation treatment to the cervix was begun. At the same time, as the vaginal discharge seemed insufficient to cause such widespread eczema, a catheter specimen was taken and revealed numerous coli and streptococci, from which an autogenous vaccine was prepared and given. Less than my usual dose of X rays was given to the vulva, anus, and intergluteal fold. The mercury-vapour ultra-violet light was given twice, then thrice a week, to the whole region; 2 feet distance for two, then three minutes—eight doses in all. High frequency, nine doses of 15 minutes were given to the vulva daily. Thyroid, pituitary, and a diet were ordered. Every soothing cream I could prescribe, as well as the usual protective ointment for the vulva, and coal-tar for the anus, was tried; of all these the patient preferred lipol. As she was seen daily, changes in treatment were made according to the daily indications. Within a month all the affected parts looked normal. The vaccine was carried on after she left London. When she ceased vaccine in September, pruritus began, and on resumption of vaccine it ceased. I therefore advised her to carry on with vaccine for a year. The local trouble remained cured and a much higher level of general health was maintained. She attributed the lasting results to the vaccine. I attributed much of the success to the improvement of the general health with thyroid and corrected diet.

Principles Guiding Local Treatment.

When called upon to treat a case of vulvar eczema the practitioner should pass in review all the causes, and remember that more than one may be in operation. The principles guiding the local treatment are those employed for all skin diseases. Soothing remedies are indicated where there is hyperæmia and acute inflammation, stimulating remedies when the condition has become chronic, exfoliating applications in late stages of induration. When only hyperæmia is seen, as in the early stage of a colon bacillus infection arising from external sources, it is surprising how often it will yield to simple boric ointment. In all acute conditions, calamine lotion or cream is a justly popular soothing remedy. It is important to use only the best powders; I have often found a calamine lotion contain so much gritty material that it was not a soothing, but a very irritating application. When the inflamed parts show moist exudation, Lassar's paste (zinci oxidi, amyli, āā ℥i.–℥ii., paraff. moll. ℥i.), without salicylic acid, answers well; when there is dry induration of long standing, the mild mercurial or tar ointments do best. Pure carbolic acid, strong salicylic acid, or diathermy sparking will cause exfoliation; soothing remedies are then applied to the fresh membrane beneath. X ray treatment is indicated only in chronic conditions, especially if the patient can be seen but seldom. The full effect of the dose is not gauged until about ten days have elapsed; the patient should be warned of this fact. When the patient can be seen frequently other methods should be tried before resort to X rays. High frequency is especially indicated when there is much swelling, in both acute and chronic cases. The small portable apparatus is not without value when the large instrument is not available. The correct technique for the best use of ultra-violet light is not yet known. A strong dose is excellent; but the patient should be told that this involves pain and staying in bed. The slower methods hasten cure, especially when pigmentation occurs. Direct sunlight in our climate is rarely too strong, and still more rarely is it available for many days in succession; the practitioner need not fear to order exposures of half to one hour daily for one or two weeks.

General treatment is of the utmost importance when the urine contains sugar or micro-organisms. It can often be foretold, from the aspect of a patient, that a catheter specimen will reveal the presence of colon bacilli, streptococci, or both. In young women the pulse is rapid, the heart often dilated; in older women there is frequently evidence of defective thyroid and pituitary action. Colon bacillus infections are prone to relapse, largely because the patients will not persevere with the local protective measures necessary to prevent reinfection. When colon bacilli and streptococci are found in the urine vaccines play a prominent part in treatment. With sensitive, delicate women, who have a rapid pulse, it is important to avoid reactions. Overdosage prolongs their illness; hence the initial doses must be small, say 50,000, with cautious increase up to 1,000,000. Both streptococcal and colon bacillus vaccines are helpful in extensive eczema starting from the anus, for they aid the general resistance of the patient, and no measure which achieves this can be omitted. At the menopause, and at any time when there is evidence of deficient endocrine activity, the correcting gland should be administered. In the near future the biochemist will explain to us why calcium lactate is so often useful in these cases.

AGNES SAVILL, M.D. Glasg., M.R.C.P. Irel.,
Physician to the London Skin Hospital.

Special Articles.

THE ALLEGED TOXIC ACTION OF ACCESSORY FOOD FACTORS.

By J. CLIFFORD HOYLE, M.B., B.S.,
ERNEST HART MEMORIAL SCHOLAR.

(From the Pharmacological Laboratory, Cambridge.)

VITAMINS, or accessory food substances, in relatively minute amounts are essential constituents of the perfect food. As it is now customary to administer these substances in quantities out of all proportion to those found in natural foods, it is of some importance to inquire how far, if at all, these excessive amounts are objectionable.

Hopkins [1] in 1923 first suggested that a balance of vitamins in the diet might be an important factor in the maintenance of normal health. He found that rats failed to grow when an excess of cod-liver oil was given in addition to the normal diet, but that this event could be prevented by administering an excess of vitamin B, as marmite. Evidence was not available at that time to show whether vitamin A, vitamin D, or some other constituent of cod-liver oil was the factor responsible for the disturbance of health. Takahashi [2 3] had previously claimed that a purified extract of vitamin A administered to rats in excessive amount caused cessation of growth and later death; but Drummond [4] refuted this statement and showed that no harmful results followed the administration of large amounts of active preparations. Magliano [5] also found no detrimental effects to growing animals from large doses of vitamin A.

It is evident from these results that no reason at present exists to prove that excess of vitamin A was the poisonous factor in the observations made by Hopkins with cod-liver oil. Mouriquand and Michel [6] in guinea-pigs and Bezssonoff in clinical cases [7] found that large doses of cod-liver oil were detrimental in scurvy. Euler and Widell [8] claimed that an excess of cod-liver oil gave rise to faulty growth and bone formation in rats, but that this was prevented by increasing the allowance of vitamin C. Arvay [9] and Agduhr [10] have recently reported degenerative changes in the myocardium of rats fed with excess cod-liver oil, but Höjer [11] criticised the latter's results on the ground that an inadequate amount of vitamin B complex had been given. Hartwell [12] and Sure [13] found that an excess of cod-liver oil given in addition to a normal diet resulted in failure of growth and gestation in female rats. This has been confirmed by Harris and Moore,[11] who have shown that if the allowance of vitamin B complex, given as marmite extract, is increased from about 6 to 12 per cent. growth proceeds fairly normally but gestation is still rare, and when it occurs usually terminates abnormally. They found also that when an excess of the unsaponifiable material of cod-liver oil was given with a diet in which vitamin B complex was absent the rats lost weight more rapidly and suffered from skin lesions simulating those of pellagra.

Interpretation of Experimental Observations.

It is obvious that the interpretation of such experiments is at present a matter for conjecture; they are often regarded as examples of defective vitamin balance though without valid evidence. In no case has it been possible to administer a reasonably pure preparation of the vitamins tested, and until this can be done it must remain questionable whether the changes established are not the result of some toxic factor other than that of deficient vitamin balance. The position at present is that although considerable evidence exists to show that an excess of cod-liver oil is definitely harmful in animal experiments, and some to suggest that when increased marmite is given at the same time the effects may be modified, we have no reason to suppose that such changes are due to the vitamin content of the oil.

Since the discovery by Rosenheim and Webster [15] that irradiated ergosterol is the parent substance of vitamin D, it has been possible to administer this vitamin in far larger doses and in a purer form than has been the case up to now for any other accessory food factor; and already many observations have been recorded showing the effects of large doses in animals taking otherwise normal diets. Pfannenstiel [16] found that grossly excessive amounts resulted in the death of young rabbits. Kreitmair and Moll [17] extended this work and found that mice, rats, cats, rabbits, dogs, and guinea-pigs were killed in periods ranging from 15 to 40 days with doses varying from 1 to 40 milligrammes daily. In all cases the animals lost weight profoundly, and at post-mortem examination the spleens were atrophic and the small intestines showed hæmorrhagic enteritis. But the most striking lesions were found in the vascular system, in which an extensive arteriosclerosis, involving the aorta and other main arteries, was present. In most of these lesions considerable deposition of calcium salts occurred, and this was a feature also in the lungs, kidneys, and intercostal muscles. In most cases this was accompanied by a secondary sclerosis. Kreitmair and Hintzelmann [18] have since confirmed this, and described in detail the pathological changes found; and Harris and Moore [14] have noted that death may occur in rats though they describe no post-mortem changes.

There is thus a considerable body of evidence to show that irradiated ergosterol when administered to animals in large amounts possesses highly toxic properties. The German workers considered that these changes constituted a "hypervitaminosis." Dixon and Hoyle [19] failed to confirm these results; when a few mg. were given daily to rats no changes were found. On the other hand, when the irradiated ergosterol varied from 11 to 18 mg. daily in a diet otherwise normal the animals failed to grow, and at post-mortem examination urinary calculi were found; but lethal effects and the changes described by the German workers were consistently absent. Klein has also failed to confirm the lethal effects in a recent investigation.[20]

The Method of Irradiation of Ergosterol.

In view of these contradictory results with preparations of irradiated ergosterol of similar antirachitic potency, Dixon and Hoyle suggested that another factor might be at work producing direct toxic action. They emphasised that the method of irradiation might well be a crucial factor in this connexion. The ergosterol used in their experiments was irradiated in solution in oil and in the absence of oxygen. The German workers did not state their method of irradiation, but in the experiments of Harris and Moore, in which corresponding lethal effects were found, the irradiation was carried out in alcoholic solution. It may well be that when irradiated in this way ergosterol forms some toxic by-product in addition to vitamin D, whereas when the irradiation is effected in an oily medium, as occurs in nature in the epidermis, this does not occur.

The position on this question is at present, therefore, open, though it is obvious that it is important. If the suggestion made by Dixon and Hoyle is substantiated then ergosterol for commercial use must be irradiated in oily solution. In this country this already obtains, but abroad an alcoholic or ethereal solution is largely employed. It is true that the toxic doses in animal experiments are exceedingly high compared with the therapeutic doses, but it should be remembered that these experiments have been made only on normal animals, and it is not known how far this ratio applies in initial vitamin deficiencies or other nutritional disturbances.

Calcium Deposition.

If the position of the German workers is confirmed and their results are in fact a true "hypervitaminosis" then a considerable addition to our knowledge of the ætiology of experimental arteriosclerosis will have been made. For it is generally believed at present that two stages occur in the production of this condition—an initial injury, mechanical or toxic, to some part of the vessel wall, and later compensatory proliferative changes and sclerosis, with calcification of the dead tissue at the same time. If this conception is upheld either vitamin D must be sufficiently toxic in large doses to injure the vessel wall directly, or it must be assumed that the injury is brought about by primary calcium deposition in the vessel wall, the result of an excessive mobilisation by the vitamin. If the former hypothesis were true it would constitute the first known instance of a physiological substance producing an effect in excessive amounts that is unrelated to its normal action; if the second hypothesis were true, then it is evident that arterial lesions, due to primary calcium deposition in the vessel walls, would be expected in all conditions associated with excessive calcium mobilisation.

In clinical arteriosclerosis there is no evidence to suggest that excessive calcium mobilisation is a factor in the production of the injury to the vessel wall; the blood calcium has only been recorded in essential hypertension but here it is normal,[21] and in the earliest lesions calcium deposition is not found. Calcium deposition is essentially a secondary phenomenon. On the other hand, it is known that widespread "metastatic" calcification occurs in conditions where a pronounced degree of bone resorption is taking place, such as in osteosarcoma, osteomalacia,[22] and osteitis fibrosa.[23] In these diseases the blood calcium is usually higher than normal [24-26]; and in many, if not all, cases of osteomalacia and osteitis fibrosa parathyroid tumours or hyperplasia occur.[27-33 etc.] Recent work [34-36] has shown that the parathyroid hormone raises the blood calcium by mobilising calcium from the soft tissues and ultimately the bones. This strongly suggests that in the diseases mentioned the bone resorption and raised blood calcium level are due directly to increased functional activity of the parathyroid glands. In such cases there is no evidence of any preceding injury to the tissues and the metastatic calcification may depend entirely upon the increase in blood calcium. This view of the part played by the parathyroid glands in these conditions is supported by the work of Hueper,[37] who found extensive calcification in the organs of dogs that had received repeated injections of Collip's parathyroid hormone.

All this evidence suggests that under certain conditions calcium deposition in tissues may occur readily without gross preliminary injury. Histological evidence, however, in no case excludes the possibility of some damage to the cells which is not revealed by microscopic techniques. Nevertheless, it may be that the calcification found by the German workers to occur in animals that have been receiving a marked excess of vitamin D is similar to that found in such conditions as osteomalacia and osteitis fibrosa in that it is independent of preliminary gross injury to the tissues. If this is the explanation such animals should show a pronounced hypercalcæmia. Klein [20] found a 50 per cent. increase in the blood calcium in his experimental rats, but as he did not state in what solvent his ergosterol had been irradiated, and did not report post-mortem findings, his figures lose their main value. Apart from this no investigations into the point have yet been reported.

Although Dixon and Hoyle [19] failed to confirm the results obtained by the German workers, they found calculi composed of calcium phosphate in the urinary tract, with secondary mechanical changes in many cases. This has been confirmed in unpublished experiments by the writer. Dixon and Hoyle pointed out the possible importance of these observations in the ætiology of urolithiasis in tropical countries, where calcium phosphate calculi are common, apart from bilharzia infection. They suggested that prolonged exposure to the very powerful solar rays of such climates might well produce excess of vitamin D in the skin; and this appears probable when it is considered that only about 2 per cent. of those rays which have maximum ability to produce vitamin D from ergosterol penetrate the pigment layer. Therefore, under normal conditions, irradiation of the skin ergosterol must occur in that part which is superficial to or included in the pigment layer, and this must apply also under conditions of excessive irradiation.

Vitamin A Deficiency.

The same authors further suggested that in the case of natives in tropical countries a second factor which is well established for some populations—lack of vitamin A [38]—might play an important part. It is known that deficiency of vitamin A predisposes to infective processes,[11-19] and that the urinary tract is frequently affected. Moreover, it has been shown [47 and 50-55] that with such a deficiency in the diet the formation of calcium phosphate calculi in the urinary tract is frequent and it is probable that the two conditions, infection and urolithiasis, are related as cause and effect.

In the case of populations habitually consuming diets defective in vitamin A and at the same time exposed to the possibility of forming excessive quantities of vitamin D from solar irradiation, it is obvious that the two factors would work in the same direction to produce urinary calculi. In this way a degree of deficiency of vitamin A or excess of vitamin D either of which acting separately might be quite inadequate to induce calculi formation, when acting together might well do so. Such a condition would illustrate clearly the significance of "vitamin balance" in the case of the fat-soluble accessory factors.

References.

1. Hopkins, F. G.: Brit. Med. Jour., 1923, ii., 690.
2. Takahashi, K.: Jour. Chem. Soc., Japan, 1922, xliii., 828.
3. Takahashi, K., and Kawakami, K.: Ibid., 1923, xliv., 590.
4. Drummond, J. C., Channon, H. J., and Coward, K. H.: Biochem. Jour., 1925, xix., 1047.
5. Magliano: Rev. Biol., 1925, vii., 619.
6. Mouriquand, G., and Michel, P.: Compt. Rend. Soc. Biol., 1922, lxxxvi., 1170.
7. Bezssanoff, N.: Bull. Soc. Hyg. Aliment., 1923, xi., 14.
8. Euler, H. v., and Widell, H.: Z. Phys. Chem., 1925, cxliv., 132.
9. Arvay, S.: Ber. ges. Physiol., 1927, xliii., 59.
10. Agduhr, E.: Acta Pedriatica, 1926, v., 319.
11. Höjer, A.: Ibid., 1926, vi., 180.
12. Hartwell, G. A.: Biochem. Jour., 1927, xxi., 1076.
13. Sure, B.: Jour. Biol. Chem., 1927, lxxiv., 45.
14. Harris, L. J., and Moore, T.: Biochem. Jour., 1928, xxii., 1461.
15. Rosenheim, O., and Webster, T. A.: Ibid., 1927, xxi., 389.
16. Pfannensteil, W.: Klin. Woch., 1927, xlviii., 2310; and Munch. Med. Woch., 1928, xxvi., 1113.
17. Kreitmair, H., and Moll, Th.: Munch. Med. Woch., 1928, xv., 637.
18. Kreitmair, H., and Hintzelmann, U.: Archiv für Exp. Path. u. Pharm., 1928, cxxxvii., 203.
19. Dixon W. E., and Hoyle, J. C.: Brit. Med. Jour., 1928, ii., 832.
20. Klein, I. J.: Jour. Amer. Med. Assoc., 1929, xcii., 621.
21. Brems, A.: Acta Med. Scand., 1927, lxvi., 473.
22. Tschirtowitsch, T., and Kolessnihoff, H.: Virch. Archiv. für Path. Anat., 1909, cxcvii., 112.
23. Dawson, J. W., and Struthers, J. W.: Edin. Med. Jour., 1923, xxx., 421.
24. Alker, A.: Deutsch. Med. Woch., 1925, li., 151.
25. Rösner: Klin. Woch., 1927, vi., 1449.
26. Lambie, C. G.: Brit. Med. Jour., 1927, ii., 785.
27. Erdheim, J.: Ziegler's Beiträge. z. Path. Anat., 1903, Bd. xxxiii, S. 158.
28. Bauer, T.: Frankf. Zeits. für Path., 1911, Bd. vii., S. 231.
29. Todyo, T.: Ibid., 1912, Bd. x., S. 219.
30. Molineus, G.: Arch. für Klin. Chir., 1913, Bd. ci., S. 334.
31. Meyer, O.: Frankf. Zeits. für Path., 1917, Bd. xx., S. 113.
32. Keri, F.: Deutsch. Med. Woch., 1925, li., 1271.
33. Gödel, A.: Wien. Klin. Woch., 1925, xxxviii., 246.
34. Stewart, C. P., and Percival, G. H.: Biochem. Jour., 1927, xxi., 301.
35. Greenwald, I., and Gross, J.: Jour. Biol. Chem., 1925, lxvi., 217; and 1926, lxviii., 325.

(*References continued at foot of next page.*)

MEDICINE AND THE LAW.

Acquittal on Charge of Criminal Abortion.

Dr. Daniel Evans Powell, of High-street, Tooting, was acquitted at the Central Criminal Court on March 27th on an indictment charging him with the manslaughter of Mrs. Doris Ruth Simmons, a London schoolmistress, and with using an instrument or other unknown means to procure her miscarriage. Dr. Powell, who pleaded "Not Guilty," was defended by Sir Patrick Hastings, K.C. The husband of the dead woman gave evidence that on Nov. 25th he went to Dr. Powell's surgery and told him that some capsules which the doctor had given his wife did not agree with her, and asked if he would give her something else. Dr. Powell, he said, gave him two bottles of medicine and a packet of lint. Next day Dr. Powell gave a certificate that Mrs. Simmons was suffering from influenza and rheumatism. After further visits from Dr. Powell, Dr. Le Maistre (the usual family doctor) was called in. On Dec. 10th, Dr. Powell gave another certificate that Mrs. Simmons was suffering from gastric enteritis. Sir Bernard Spilsbury, who made a post-mortem examination of the body on Dec. 14th, attributed the death to syncope as a result of abortion, septic condition, and inflammation of the kidneys. He stated in evidence that the abortion had, he considered, been brought about by the passage of an instrument, and that it must have been done by a skilled person. Dr. F. J. McCann, of Upper Wimpole-street, giving evidence for the defence, said that a woman suffering from nephritis might have a miscarriage in the early stages of pregnancy. The evidence of the deceased's symptoms, he said, disclosed a common condition, and there was nothing in the symptoms to indicate that miscarriage was other than natural. Dr. Powell in the witness-box denied having performed any operation. A half-hearted suggestion by the prosecution that he had administered morphia to the dying woman to prevent her making any admission or confession was also repudiated. It was complained by the defence that Dr. Powell had not had a proper opportunity of being represented at the post-mortem examination.

Dr. Powell had been committed for trial by the magistrate at the police-court for South-West London as well as on a coroner's jury's verdict of manslaughter. Mr. Ingleby Oddie's summing up at the inquest was to the effect that Mrs. Simmons, a schoolmistress, whose youngest child was 8 years old, was anxious to have no more children; that she spoke on this subject to her husband, to a Miss Marsh, who got her some pills which proved ineffective, and to Dr. Le Maistre, her family doctor, who strongly dissuaded her from any kind of attempted abortion, whether by drugs or otherwise; and that it was in these circumstances, when the pills and the medical adviser had failed her, that she had recourse to a doctor whom she had never before consulted. The recent verdict of "Not Guilty" at the Central Criminal Court cancels, of course, the coroner's jury's verdict of "Guilty of Manslaughter" delivered several weeks ago. As was pointed out last year in connexion with the trial of Mrs. Pace, there should be some provision by which a subsequent acquittal has the effect of removing from the records any trace of a verdict of "guilty" found by a coroner's jury.

The Locking of Parked Cars.

Recent prosecutions have drawn attention to the official prohibition of the practice of leaving a motor-car at a parking place in London with locked doors. This was made an offence by the London Traffic (Parking Places) Regulations, 1928, which prescribe not only where a car may be parked, but also the conditions of parking. The material parts of the London Traffic Act, 1924 (which authorised the making of such regulations) came into operation on Oct. 1st, 1924. The Minister of Transport made his first regulations on the subject in September, 1925. These contained a scheduled list of the prescribed parking places in London, and set forth various restrictions backed by a penalty of £5. Drivers, for instance, were not to leave their engines running, nor were taxi-cabmen to ply for hire while at a parking place. For our purpose the most important clause is that which required the driver of a parked car to comply with any directions given him by a constable in uniform, including a direction to move his car from one position to another. In January, 1928, this code of regulations was superseded by a fresh one. Again there was a scheduled list and a set of restrictions; but this time it was enacted (by Article 4) that a driver must not only move his car if required, but must also "so leave the vehicle that it may be removed or moved from one position to another by manual power." No doubt by this time the mechanical devices for locking cars had become more common. As a policeman is empowered in emergency to cancel any parking privilege, and as a policeman or other authorised person may move a parked car "for any reasonable cause," it is naturally difficult to allow cars to be locked. Motorists who have escaped prosecution have sometimes found that fate has dealt hardly with tyres and mudguards. The checking of theft has to be weighed against the importance of being able to move a stationary car. The stealing of dangerous drugs and scientific instruments from medical practitioners' cars has been by no means unknown. The insurance companies have doubtless made their representations to the police, and statements in Parliament indicate that the Home Secretary and the Minister of Transport will unite in the search for some satisfactory compromise. It is hard to deny the motorist his place in a public street, but parking is officially deemed a concession. The present system is extraordinary, in that the men in charge of a parking place are not regular officials; it is understood that they are not only unpaid by the Minister or by the police, but that they have actually to purchase a licence before they can undertake their duty. They look for remuneration, therefore, to the motorists they oblige.

The motorist's grievance is that he has been left unaware of the regulations, though the Minister states that a copy of them is exhibited at each parking place. It does not seem, however, that the regulations are to be deemed an instance of bureaucratic secrecy. Under the London Traffic Act all proposals for regulations have to be sent for advice and report to the Advisory Committee on which all interests (those of the private motorist as well as those of the Home Office, the Minister, the police, and the local

DR. J. CLIFFORD HOYLE: REFERENCES.

(*Continued from previous page.*)

36. Hunter, D., and Aub, J. C.: Quart. Jour. Med., 1926–27, xx., 123.
37. Hueper, W. C.: Archiv. Path. and Lab. Med., 1927, iii., 14.
38. Padua: Philippine Jour. Sci., 1919, xiv., 481.
39. Knapp, P.: Zeit. für Exp. Path. u. Therap., 1908, v., 147.
40. Cramer, W., Drew, A. H., and Mottram, J. C.: THE LANCET, 1921, ii., 1202.
41. Drummond, J. C.: Biochem. Jour., 1919, xiii., 95.
42. Stephenson, M., and Clark, A. B.: Ibid., 1920, xiv., 502.
43. Gross, L.: Jour. Path. and Bact., 1924, xxvii., 27.
44. Goldblatt, H., and Benischek, M.: Jour. Exp. Med., 1927, xlvi., 699.
45. Macy, I. G., Outhouse, J., Graham, A., and Long, M. L.: Jour. Biol. Chem., 1927, lxxiii., 175.
46. Sherman, H. C., and Burtis, M. P.: Proc. Soc. Exp. Biol. and Med., 1928, xxv., 649.
47. Green H. N., and Mellanby, E.: Brit. Med. Jour., 1928, ii., 691.
48. Turner, R. G.: Proc. Soc. Exp. Biol. and Med., 1928, xxvi., 233.
49. Tyson, M. D., and Smith, A. H.: Amer. Jour. Path., 1929, v., 57.
50. Osborne, T. B., and Mendel, L. B.: Jour. Amer. Med. Assoc., 1917, lxix., 32.
51. McCollum, E. V.: Lectures on Nutrition, Philadelphia, 1925, p. 137.
52. Fujimaki, Y.: Jap. Med. World, 1926, vi., 29.
53. Saiki, T.: Deutsche Med. Woch., 1927, liii., 517.
54. Van Leersum, E. C.: Jour. Biol. Chem., 1928, lxxvi., 137.
55. McCarrison, R.: Indian Jour. Med. Research, 1927, xiv., 895; 1927, xv., 485, 801; and Brit. Med. Jour., 1927, i., 717.

authorities) are represented. In this particular instance the Minister notified in the *London Gazette* in August, 1927, his intention to make regulations; his notification stated where copies could be obtained. When he actually made them in the following January a communiqué was issued to the press, and copies were laid before both Houses of Parliament for 28 days, during which objection could have been taken to them. But he would be an optimistic official who assumed that Members of Parliament read all the papers which are laid before the House, or that motorists make a regular study of the *London Gazette* or of the files of Statutory Rules and Orders. In this particular case the making of regulations seems to be safeguarded by adequate publicity, but we have now so many laws that we are obliged to be ignorant of some of them.

The Society of Apothecaries and Mr. Roche.

An advertisement in the "Personal" columns of the *Times* of March 28th conveys the thanks of Mr. Raphael Roche to his friends who signed the petition to the Society of Apothecaries, organised by Sir George Hume; it also announces that the Society is not proceeding with its contemplated action. The reference is understood to be to proceedings threatened by the Society of Apothecaries of London under the Apothecaries Act of 1815. Mr. Roche, unregistered as a medical practitioner, and uncertificated as an apothecary, was informed by the Society that, unless he would give an undertaking never again to act as an apothecary within the meaning of the Act while lacking the statutory qualification, legal action would be taken to restrain him and to recover penalties. The matter being no longer sub judice, it is possible to discuss the material issue whether Mr. Roche has, in fact, acted as an apothecary. In a case noted in THE LANCET some months ago it appeared that Mr. Roche had treated with powders a patient who shortly afterwards died of cancer; an analyst gave evidence at the inquest that the only discoverable ingredient of the powders was cane sugar; Mr. Roche did not throw any vivid light on the nature of his prescription; he stated that his method was to use drugs in intangible quantities.

The Act of 1815 referred in preamble to the charter of James I., which (subject to modifications) it confirmed. It recited the "duty of every person using or exercising the art and mystery of an apothecary to prepare with exactness and to dispense such medicines as may be directed for the sick by any physician lawfully licensed," and it penalises those who "knowingly, wilfully and contumaciously" refuse to compound medicines, or who compound them "deliberately or negligently, falsely, unfaithfully, fraudulently or unduly." Three sections of the Act are specially material. Section 14 forbids persons to practise as apothecaries in any part of England or Wales unless they have first been examined and have received a certificate of due qualification; Section 20 backs up this prohibition with a fine of £20; and Section 21 allows no apothecary to recover charges in a court of law unless he proves that he has a certificate to practise. This restriction upon practice by unqualified apothecaries still holds good; it was upheld in litigation in 1885 and on other occasions. So far as the decided cases go, they seem to show that at first, when the 1815 Act was newly passed, an apothecary was regarded as a mere compounder of prescriptions. Later, to judge by a case in 1843, the apothecary had established himself as a person who applied himself to the cure of disease by medicine. It would have been interesting to have had a judicial decision on the issue whether Mr. Roche's treatment by powders containing cane sugar and other intangible ingredients does or does not amount to acting as an apothecary. A letter from his solicitors, quoted in a recent newspaper article, contends that the 1815 Act was designed to protect the public from quackery, and that the Act does not apply to Mr. Roche. They repeat the claim that he has cured or saved the lives of many people whom qualified men have been unable to assist. This kind of claim is one which no known form of judicial proceeding can with confidence establish or refute. Mr. Roche's treatment is not fully disclosed; in the popular, if not in the statutory, sense it is an art and mystery. Perhaps the only adequate method of settling such an issue is one which is unlikely to be attempted—namely, for Mr. Roche's treatment of patients to be examined at close quarters, stage by stage, by a tribunal of experts with full scientific knowledge and full opportunity of inspection. Meanwhile the Society of Apothecaries is in an uncomfortable dilemma. Either it must prosecute the uncertificated practitioner or it must seem to abrogate an important part of its corporate functions. Under English law an Act of Parliament never becomes inoperative through mere disuse; it is alive until it is definitely repealed. If it has outlived its usefulness, and is not supported by popular opinion, magistrates will inflict only negligible or nominal penalties for breach of its provisions. The Apothecaries Act of 1815 has been, and still is, far too valuable to be treated as in any sense obsolete. The Lord Mayor, prompted apparently by what others have told him of Mr. Roche, has intervened in this particular case to dissuade the Society of Apothecaries from taking proceedings. It should, nevertheless, not be assumed that the statute is dead or that its administration is a matter of personal considerations.

UNITED STATES OF AMERICA.

THE WORK OF THE PUBLIC HEALTH SERVICE.

Annual Report of the Surgeon-General.

THE 1928 report of the Surgeon-General of the United States Public Health Service not only summarises all the activities of the Divisions of the Service, but also serves as an index for special reports on much research work. It opens with a survey of health conditions throughout the world. The outbreak of plague in the Argentine was a special menace but only two cases occurred in the States, both being associated with the long-standing infection of the ground squirrels in California. The cholera situation in India is referred to as more serious than in any of the previous eight years except 1924. Cholera did not appear in the United States, but was reported in the Philippines during the summers of 1927 and 1928. Yellow fever appeared in West Africa in June, 1928, after several months' absence. There have been sporadic cases in Brazil and, in 1928, an epidemic in Rio de Janeiro, but it was not reported in the U.S.A., the last outbreak having been in 1905. Small-pox was unduly prevalent in view of the known methods of prevention. In Algeria it was epidemic in serious form; in Russia it was largely a rural disease, owing to the rigid enforcement of vaccination in the towns. In 41 of the States there were in 1925, 1926, and 1927 38,877, 31,534, and 33,750 cases respectively, with 712, 367, and 159 deaths. The experience of Detroit, Minneapolis, and Los Angeles from 1924–26 showed that the virulent type may appear without warning and cause hundreds of deaths in a single city within a few months.

During the summer and autumn of 1927 there was a widespread outbreak of infantile paralysis in the U.S.A., with a high case-fatality. The cases reported in 36 States during the last three years numbered 5585, 2445, and 8868, and the deaths 1335, 728, and 1710, giving a case-fatality of nearly 25 per cent. for the period. The deaths from pellagra (5148) showed an increase, consequent upon unfavourable industrial and economic conditions in the Mississippi valley flood area and other regions. Special researches on the anti-pellagrous properties of various foodstuffs have been made and dried yeast was made available in the flood districts.

Before 1921 the case- and death-rates from diphtheria were rising. From 1921–26 there was an

improvement. Since then there has again been an increase but the rates are not so high as formerly, owing, it is believed, to the success of the immunisation campaigns. Tuberculosis had a new low record in 1927. In 41 States, with a population of 110,000,000, the death-rate from all forms of tuberculosis has been during the last three years, 84·8, 83·3, and 77·3 per 100,000 of the population.

There were 73 deaths from rabies reported from 23 States, and it is suggested that the general use of the automobile has assisted in distributing this disease. Tularæmia has now been recognised in 31 States, 214 cases being reported, with 7 deaths, during 1927. Undulant fever is becoming more widely known, and 114 cases were reported from 17 States. Rocky Mountain spotted fever appeared in 9 States, and it is believed that there are many cases which are not reported. The vaccine made at the Montana laboratory is proving effective.

On the invitation of the English Ministry of Health the Surgeon-General sat with a departmental committee, which was inquiring into the possible danger to health from the use of gasoline treated with tetra-ethyl lead, and gratification is expressed that the British Government and the United States Health Service have reached the same decision with reference to the degree of danger involved.

Progress has been made towards the unification of milk control practice in the U.S.A. Thirteen States have now adopted a State-wide plan of milk control. A code has been prepared for the purpose of securing a uniform interpretation of the standard milk ordinance, and has been submitted for consideration and suggested amendments to the dairy organisations.

The scheme for shell-fish sanitation, instituted in 1925, has made progress, and Texas had been added to the 15 producing States which have assumed sanitary control over the shell-fish industry.

The continued studies of leprosy tend to confirm last year's appraisal of the chaulmoogra oil treatment, and the number of patients discharged from the National Leper Home with leprosy arrested is the largest on record.

The establishment of the emergency health measures necessary to prevent epidemic diseases in the Mississippi flood area has stimulated the provision of a permanent programme of public health work with full-time health units in the counties. In the investigation of cancer two lines of research are described as promising. One has to do with the employment of oscillating currents of very high frequency for the treatment of animal cancer, and the other consists of an ingenious method of measuring cellular activity in living tissues.

SCOTLAND.

(FROM OUR OWN CORRESPONDENTS.)

The Blind in Edinburgh.

As already stated in THE LANCET, a new Home for Blind Women has been established in Edinburgh, and over 40 women are in residence. There will ultimately be room for double that number, the occupants being drawn from all parts of Scotland. They are capable of doing work appropriate to the blind, but of course there remains the great problem of the unemployable blind. The estimated number runs to over 300 in immediate need of better residential accommodation. This number is not large; but, as for other chronic and incurable conditions, the accommodation has to be determined by the numbers multiplied into the expectation of life. The problem of the blind is thus on all fours with the very difficult problem of encephalitis lethargica, which produces a small number of permanently disabled.

It is gratifying to learn that the number of blind due to gonorrhœal ophthalmia shows signs of reduction within the last few years. The cases admitted to the Edinburgh School are a mere fraction of what they were ten years ago. This fairly corresponds to the experience of the clinics.

Edinburgh differs from the west in that the city has not taken over the voluntary organisation. In the west, Glasgow and several neighbouring authorities some years ago formed a combination to take over the whole institutions and organisation then managing the blind. This is competent under the Blind Persons Act. The management of the institutions is now much more satisfactory. In Edinburgh, however, the Royal Blind Asylum and School have been exceptionally well conducted and the city, which has always been represented on the management, continues to give generous support. The present new building has been erected partly by voluntary subscriptions, but largely by contributions from some five or six local authorities and from a Government grant. So long as there is this cordial cooperation between the three types of authority—central, local, and voluntary—there is no case for reform. The Health Department for Scotland appoint, for the whole country, an advisory committee, representing all interests. Through the activities of this committee, the whole Scottish problem of the blind, both indoor and outdoor, has been carefully studied, and all forms of organisation have been immensely improved. Some time ago the League of Nations took up the question of the better management of the blind and Scotland was represented at a Staff Conference in Geneva to discuss details. The Scottish Department had issued a questionaire for home use, but the League has instituted an international inquiry. As a small country, Scotland is favourably placed for dealing with a circumscribed problem of this kind. At any rate, her experience may be of service to the other small nations.

A New "Nerve Hospital."

At the annual meeting of the Royal Edinburgh Hospital, Morningside, Prof. G. M. Robertson described the new Jordanburn Nerve Hospital and Psychological Institute which is to be opened shortly as "a completely new departure, being a voluntary hospital offering for the first time a complete service of a remedial and preventive character for nervous troubles and ailments in Edinburgh and its neighbourhood." The hospital is a one-storey building of 50 beds, divided equally between the sexes. A verandah runs the whole length of the building on its southern side and faces a garden of two acres. Prof. Robertson said that the designation "nerve hospital," though unfamiliar and perhaps vague, would be understood by those who suffered from the protean manifestations of this distressing condition, and would be interpreted comprehensively. To meet the needs of the very many nervous patients who could receive treatment and were at the same time able to carry on their duties at home or in the workshop, a completely new out-patient department, costing £10,000, had been built and a clinic would be held there every forenoon at 10.30 o'clock and at other suitable hours Besides treating those who were definitely ill, and giving advice for the prevention of a threatened nervous breakdown, it was intended that this clinic should provide Edinburgh with facilities for the performance of all those psychological investigations, examinations, and mental tests that every great city should have at its disposal for its educational, social, and judicial services.

East Fortune Sanatorium is one of the most important in Scotland, for it provides accommodation for the seven south-eastern counties and all the small local authorities within them. In his annual report, Dr. Charles Cameron, the superintendent, comments on the results of treatment. These depend primarily on the state of the patient when he is sent for treatment.

These, then, are the facts of our raw material, and they are not promising. Of 113 cases of lung disease admitted, 86 (or 76 per cent.) had disease of an advanced type, while one patient only had disease in an early stage (cases being classified into early, intermediate, and advanced). Many of these cases of advanced disease do very well, and, para-

doxically, many patients do not begin to do well until their disease becomes advanced. Many of them, however, do not do well. . . . Thirty-nine patients were admitted suffering from disease of spine and bones and joints and abdomen. Twenty of these patients (or 51 per cent.) had disease of an advanced type, while three only had disease in an early stage. The more advanced the disease the longer is the time required for treatment, and already the periods of residence are high. The early cases pass out quickly.

Dr. Cameron states that in 1926 the average period of residence of those who were discharged during the year was 197 days; in 1927 and 1928 the periods were 313 days and 472 days, no account being taken of patients leaving against advice. He thinks that the prolonged residence indicates the growing appreciation of the value of the sanatorium. He considers that on the whole the results of treatment, in view of the nature of the materials, are very satisfactory. Although the sanatorium scheme alone is imperfect, there must always be a place for the healing of the disease, and the sanatorium claims to be no more than that place. "Its work is not spectacular. Its gains are made slowly and often with infinite patience; and when one ponders upon the state of the majority of those who come within its gates, one is pleasantly surprised that the results are even what they are. The sanatorium system is sound."

IRELAND.

(FROM OUR OWN CORRESPONDENT.)

Medical Certification of Insured Persons.

THE National Health Insurance Commission has taken the medical profession by surprise by a letter issued last week to the several medical certifiers. The letter states:—

"Following an interview between the Minister for Local Government and Public Health and representatives of the medical profession, it has been decided to postpone the introduction of the proposed change from the dispensary to the county basis pending further consideration by the Minister of questions concerning national health insurance as a whole.

"After consultation with the Minister for Finance, the Commission have, however, decided that the extra cost of administration entailed by the retention in certain certification areas of the dispensary district as the unit of distribution of the Medical Certification Fund cannot be allowed to remain a charge on State funds. The amount involved——viz., £800 per annum—will, therefore, without prejudice to the larger question which awaits the Minister's decision, be deducted meanwhile from the moneys made available for medical certification.

"As, however, the county boroughs and urban districts of over 10,000 inhabitants have not been affected by the Commissioners' proposals, it is not intended to charge any of the £800 against the moneys applicable to these areas, but to recover the entire amount from areas outside the county boroughs and urban districts referred to. This will mean a reduction this year of 2·65 per cent. approximately in the respective dispensary pools.

"I am to add that it is proposed to bring this arrangement into operation as from January 1st, 1929."

Hitherto, all arrangements for the certification of insured persons have been settled by negotiations between the National Health Insurance Commission and the Irish Medical Committee. The present letter came as a mandate from the Commission and not as the result of negotiations. It is true that the amount of money concerned is not large, but the manner assumed by the Commission is not likely to gain a friendly consideration of the offer.

Dinner of the Royal College of Surgeons.

The Charter Day dinner of the Royal College of Surgeons in Ireland was held last Saturday night, with the Vice-President, Mr. R. A. Stoney, in the chair. The President, Prof. T. E. Gordon, was absent on account of illness. The principal guest was Mr. James McNeill, Governor-General of the Irish Free State. In his speech, in reply to the toast of the Governor-General and Prosperity to Ireland, Mr. McNeill spoke of the prominent part taken by Irish surgeons in all parts of the world. It had certainly not been the bad fortune of the people of India, he said, that surgery in Western India had been made known to the people largely by Irishmen. Most of the surgeon-generals in the Bombay Presidency in his time had been Irish surgeons, and when he was sent on duty to the West Indies the first surgeon-general he met was an Irishman.

The other speakers included Sir William Taylor and Sir William Wheeler.

Public Health Services.

INFLUENZA.

A WEEK ago there was some recrudescence of the epidemic in South Wales and Bristol; the only localities where the disease is still prevalent are Birmingham, Dudley, Gloucester, and Essex. Last week pneumonia was reported from South-East Durham and North-East Yorkshire, and sinusitis was mentioned as a complication occurring at Cleethorpes. In Essex the disease is declining but there is still considerable incidence, more cases of pneumonia are occurring now than at the height of the epidemic wave, and polyneuritis appears again as a late effect, though not nearly so severe as in 1895. In other parts of England and Wales the epidemic is subsiding rapidly or is already over.

Abroad the epidemic is on the wane everywhere in Europe. It is now established that the areas attacked in January—i.e., particularly Eastern Germany and the Scandinavian countries—suffered less, on the whole, than those reached later by the epidemic. The mortality has been heaviest in the British Isles, Western Germany, Belgium, and Northern France. Eastern Europe has hardly suffered. The disease has been very mild in Switzerland.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED MARCH 23RD, 1929.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 288; scarlet fever, 2192; diphtheria, 1144; enteric fever, 24; pneumonia, 3578 (last week 4897); puerperal fever, 61; puerperal pyrexia, 121; cerebro-spinal fever, 24; acute poliomyelitis, 3; acute polio-encephalitis, 1; encephalitis lethargica, 22; continued fever, 1; dysentery, 3; ophthalmia neonatorum, 111. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the Metropolitan Asylums Board on March 26th–27th was as follows:—Small-pox, 142 under treatment, 4 under observation; scarlet fever, 1627; diphtheria, 1838; enteric fever, 10; measles, 100; whooping-cough, 1212; puerperal fever, 23 (plus 12 babies); encephalitis lethargica, 78; poliomyelitis, 4; "other diseases," 72. At St. Margaret's Hospital there were 7 babies (plus 3 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there was no death from small-pox, 1 (1) from enteric fever, 87 (2) from measles, 9 (0) from scarlet fever, 229 (80) from whooping-cough, 37 (8) from diphtheria, 44 (14) from diarrhœa and enteritis under two years, and 966 (141) from influenza. The figures in parentheses are those for London itself.

Deaths attributed to influenza have fallen rapidly from the level of the previous week, and from the table given by the Registrar-General to illustrate the progress of the recent influenza epidemic in different parts of the country it is seen that the annual death-rate for the week ended March 23rd was in every case substantially lower than that for the preceding fortnight, the aggregate figure being 2·56, the highest (for the Midlands) 4·33, and the lowest (for Greater

London) 1·67. In the same week the death-rate from all causes for the 107 great towns was 21·4, the highest figures being Birmingham 24·5 and Sheffield 23·1. More than 20 deaths were still attributed to influenza in the following towns—namely: Birmingham, 93; Sheffield, 52; Bradford, 32; Sunderland, 27; Bristol, 22; Nottingham, 21. In Liverpool 20 deaths were ascribed to measles; 10 in Sunderland. The deaths from whooping-cough remain widely scattered over the country, Manchester heading the list with 14, Liverpool recording 11, Leeds 9, Swansea 8, West Bromwich 7, and Hull 6.

The number of stillbirths registered during the week was 315 (corresponding to a rate of 43 per 1000 births), including 60 in London.

Deaths from Small-pox.—With regard to the death in the county borough of Derby assigned to small-pox by the Registrar-General in the return for the week ended March 16th, Dr. A. E. Brindley, medical officer of health, informs us that the patient was a man aged 61 years, vaccinated in infancy, but not revaccinated. He was the father of a son, aged 27 years, who was removed to the small-pox hospital on Feb. 27th. The man himself was kept under observation and on March 15th was found to be seriously ill by Dr. Haigh, assistant medical officer of health, no other doctor having been in attendance. He died a few hours later, the symptoms being apparently those of the influenzal pneumonic type. He had one or two small-pox spots, and death was certified as (1*a*) pneumonia, (*b*) influenza; (2) small-pox. It is quite possible in this case, Dr. Brindley adds, that the man died from influenzal pneumonia, but if so he had undoubted small-pox at the same time.

A second fatal case, which occurred in the Metropolitan Borough of Finsbury, was that of a male infant aged 8 months, one of twins both unvaccinated, who died rather suddenly on March 8th after having been ill for about two days. Dr. A. E. Thomas, medical officer of health, who saw the body shortly after death, noted blotchy hæmorrhages on both flanks and thighs ranging in diameter from one-eighth to three-eighths inch. Their distribution complied with the known distribution of hæmorrhagic small-pox but the blotches were larger than those usually described. Up to the present no other case of small-pox has occurred in the family or in the house and the diagnosis of hæmorrhagic small-pox is regarded as provisional. The post-mortem examination disclosed no obvious cause of death and there was no inquest.

Provisional Death-rates.

The Registrar-General gives the provisional death-rates per million population for England and Wales during the year 1928, as follows:—

	Males.	Females.	Persons.
Respiratory tuberculosis ..	879	641	755
Other tuberculosis	188	159	173
Cancer	1377	1469	1425

In the same year the provisional mortality of women in childbirth from puerperal sepsis was 1·80, from other accidents and diseases of pregnancy and parturition 2·63, the ratio in each case being per 1000 live births.

A COUNTRY HOME FOR CHILDREN.—The Carnegie Dunfermline Trustees have acquired Bandrum House, which occupies a commanding site within three miles of Dunfermline, as a home for children who are physically below par. The children will be kept as long as they are likely to be improved or until their powers of resistance are strengthened.

WORK OF THE VOLUNTARY HOSPITALS.—*Victoria Hospital, Kingston-on-Thames:* This hospital is to be enlarged by building a children's ward and a ward for private patients, and a new X ray apparatus is to be installed. —*Royal Portsmouth Hospital:* The annual report emphasises the necessity for separating the medical and surgical cases into separate wards—the overcrowding of the hospital is especially severe on the surgical side. Last year there were 2500 operations and a second theatre is urgently needed.—*Poplar Hospital for Accidents:* The number of in-patients increased from 1604 to 2150. The stay of each patient dropped from 20 to 15½ days. The X ray and massage departments are said to need enlargement and better equipment.—*Cheltenham Hospital:* This institution is being enlarged by the addition of 24 beds, six of which will be reserved for paying patients, and the out-patient department is being extensively remodelled.

Correspondence.

"Audi alteram partem."

X RAY EXAMINATION AFTER INJURY.

To the Editor of THE LANCET.

SIR,—Dr. Gordon Ward raises such an important point that I think his challenge should not go unanswered. I have been a vice-president of the Medical Defence Union for some years, but now have retired, so perhaps I am at liberty to speak. The Union does not give its members ill-considered advice. Through large experience the Union has become by far the best judge as to the danger of any procedure taken, or not taken, by a medical man. The number of cases brought before the Union, in which medical men are charged with negligence for not taking an X ray photograph after an injury, is far in excess of the occasional cases which may come to the notice of the medical practitioners. For when the Union supports its members a large majority of cases are dropped and nothing is heard of them. At the same time the cost of these cases to the Union must be considerable. The worry and distress caused to the doctor is a lesson to anyone who has unfortunately seen it. To omit to take an X ray photograph, and then be sued for negligence, by an unrecovered patient who has for evidence an X ray photograph, taken subsequently and showing a fracture, produces a position almost impossible to get out of unless supported by the Union. If the Union is willing to give its support, its advice should be taken.

A legal opponent in a case of this description knows full well that the chances of finding a fracture are such that an X ray is imperative, and the expense of the photograph more than justified. Why should not the doctor think so too, and be first in the field? From experience at the Union, and in my own work, fractures have been found in many unsuspected cases; especially recently have I found them in the skull. I have found that the advice of the Union is wise, and I have been saved considerable discomfiture thereby. For these reasons I do not think that Dr. Ward should demur at putting a patient to the comparatively small cost of an X ray photograph considering the issues at stake on both sides. Rather would I suggest that he might look upon the time and money spent as an excellent form of insurance both for himself and his patient.

I am, Sir, yours faithfully,

HORACE HILL, M.R.C.P.

Gillingham Green, Kent, April 2nd, 1929.

THE STUDY OF INDUSTRIAL HYGIENE.

To the Editor of THE LANCET.

SIR,—It is well for a culprit to make a full confession of his misdeeds, so I was glad to read Dr. Carozzi's letter in your issue of to-day. The charge was that Dr. Carozzi had strung together the dicta of various writers (some unnamed, all without bibliographical references), the accuracy and relevance of which he had neither appraised nor had sufficient technical knowledge (statistical and other) to appraise.

Dr. Carozzi—angrily, of course, but explicitly—pleads guilty, and even gives us a sketch of himself at work with scissors and a paste pot, joining the opinions of A to the observations of B and the speculations of C. What is it to him whether A's opinions were correct, the observations of B typical, or the speculations of C credible? D finds that 16 per cent. of the deaths known to him were due to tuberculosis, E has found 75 per cent.; F actually finds that from a third to half the living workers examined by him were suffering from pulmonary tuberculosis. What does it matter to Dr. Carozzi that proportional mortality is a function of age distribution and the diagnosis of tuberculosis a function of the standard

of examination; what does he care whether like is being compared with like! A, B, C, D, E, and F are "authorities," one adds their several authoritativenesses together and reaches the sham omniscience of the Geneva brochure.

Non tali auxilio nec defensoribus istis
Tempus eget.

Every great newspaper has on its staff journalists as competent as Dr. Carozzi, straightforward men not professing to be anything *but* journalists. It is indeed well that Dr. Carozzi should have explained his position.

I am, Sir, yours faithfully,

March 30th, 1929. MAJOR GREENWOOD.

THE EMPLOYMENT OF BACTERIA IN MODERN WARFARE.

To the Editor of THE LANCET.

SIR,—According to newspaper reports, Sir Berkeley Moynihan has publicly repeated the allegation that during the late war plague bacilli were employed by the German Army. Our distinguished colleague might well have been expected to make absolutely sure of his facts before venturing to proclaim such an accusation. Yet not only has our Government solemnly denied having used such methods, but even experts of the allied countries have borne out this statement—e.g., Dr. Paul, head of the French Poison Gas Service. What is more, the employment of bacteria was not even planned! We and our colleagues who were hygienic advisors to the Army in France and Belgium were never consulted on this question from beginning to end of the war.

But quite apart from these considerations, it is obvious to every bacteriologist that pathogenic bacteria are totally unsuitable as implements of warfare, since their action is uncertain, their range of action limited, and the danger to the troops employing them far too great. These arguments were fully stated by one of us (Pf.) in a report made at the request of the League of Nations shortly after the war; they were endorsed by Dr. Thorvald Madsen, President of the Hygiene Organisation of the League of Nations: (1) Owing to their rapid loss of virulence, all pathogenic bacteria cannot be kept at a high and constant level of infectivity. (2) But even assuming this problem to have been mastered, the technique of transmitting the bacteria to the enemy presents insurmountable difficulties. In explosive missiles bacteria would be instantly destroyed by the heat of explosion. (3) If flasks of culture were projected—e.g., from aeroplanes—there is hardly the faintest chance of infecting a few isolated persons, but never of setting up epidemic foci, whilst any bacteria not at once penetrating into the body would speedily die. (4) As regards the idea of infecting rats and letting them loose in the direction of the enemy's lines, this would manifestly be a far greater danger to our own troops, who would thus be "hoist by their own petard."

We can therefore but regret that a man of such high professional standing and knowledge should propound these unfounded and erroneous statements. This is the more to be deprecated because of the harm thus caused to the spirit of mutual understanding and scientific intercourse which is gradually beginning to replace war- and post-war-psychosis. Ten years after the war we Europeans have more serious anxieties than to repeat disproved accusations!

We are, Sir, your obedient servants,

RICHARD PFEIFFER, M.D.Berl., F.R.S.Lond.,
Emeritus Professor of Hygiene in the University of Breslau.

CARL PRAUSNITZ, M.D. Bresl., M.R.C.S. Eng., L.R.C.P. Lond.,
Professor of Hygiene in the University of Breslau.

Breslau, March 24th, 1929.

*** The reference is to a remark made by Lord Moynihan at the Authors' Club on Feb. 25th when, as reported in the *Times* of the following day, he said: "We heard in 1916 that the Germans were going to use plague as a lethal weapon and we actually recovered plague bacilli from bombs dropped over the Fifth Army." In the History of the Great War based on Official Documents (Medical Services. Hygiene of the War, Vol. II., 1923) Major T. J. Mitchell, dealing with prevention of plague, stated (p. 458): "On the Western front in February, 1916, it was rumoured that the Germans might use plague as an offensive weapon against the allied armies, but this was considered highly improbable," and (p. 460): "In January, 1918, the D.M.S. of the Fifth Army reported that the mobile laboratory in his area had examined some material dropped by an enemy balloon, and that bacilli resembling the *Bacillus pestis* had been isolated." We are glad to have this authoritative assurance from high German sources that no such offensive weapon was used.—ED. L.

GAMMA RADIATION.

To the Editor of THE LANCET.

SIR,—In reply to Sir Charles Gordon-Watson and Mr. Stanford Cade, we had thought it was common knowledge that beta rays will not pass through such screens as we used, and that the length of a container has nothing whatever to do with the nature of the radiations it transmits. It is disappointing that "after careful perusal" of our note our critics failed to discover that we only suggested the use of an old-fashioned method in cases where other measures were inapplicable. We were at pains to state the dosage of gamma rays which produced necrosis and to indicate the dosage which seemed to give the best results.—We are, Sir, yours faithfully,

CECIL P. G. WAKELEY.
HECTOR A. COLWELL.

King's College Hospital, S.E., March 28th, 1929.

The Services.

ROYAL ARMY MEDICAL CORPS.

Maj.-Gen. W. H. S. Nickerson, late R.A.M.C., is placed on half pay.

Col. H. Ensor, late R.A.M.C., to be Maj.-Gen., vice Maj.-Gen. Nickerson.

Lt.-Col. L. M. Purser, from R.A.M.C., to be Col.

Maj. and Bt. Lt.-Col. W. P. MacArthur to be Lt.-Col., vice Lt.-Col. Purser.

Maj. J. T. Simson, from R.A.M.C. Res. of Off., to be Maj.

Temp. Lt. G. F. Maher relinquishes his commn.

Lt. (on prob.) H. E. Knott, from the seed. list, is restd. to the estabt.

ARMY RESERVE OF OFFICERS.

Lt.-Col. F. W. Cotton, having attained the age limit of liability to recall, ceases to belong to the Res. of Off.

TERRITORIAL ARMY.

Lts. G. Tudhope and D. Jack to be Capts.

TERRITORIAL ARMY RESERVE OF OFFICERS.

Lt.-Col. E. J. D. Taylor, having attained the age limit, relinquishes his commn. and retains his rank.

ROYAL AIR FORCE.

Flying Officer E. J. T. McWeeney is promoted to the rank of Flight Lt.

Flying Officer G. M. Titterington (temp. Lt., General List, Army Dental Surgeon) relinquishes his temporary commission in the R.A.F. on completion of service.

INDIAN MEDICAL SERVICE.

Majs. to be Lt.-Cols.—A. J. Lee, C. H. Smith, A. MacD. Dick, M. J. Holgate, T. L. Bomford, W. A. M. Jack, A. C. Anderson, Keshav Sadashiv Thakur, E. H. V. Hodge, G. T. Burke, M. A. Nicholson.

To be Lts. (on prob.).—K. F. Alford, H. J. Curran, H. T. McWilliams, P. Shannon, G. J. O'Connor, B. J. Griffiths, E. A. Y. Mackeown, H. S. Waters, W. P. Lappin, G. Milne, A. M. Fraser, D. L. Trant, and W. Walsh.

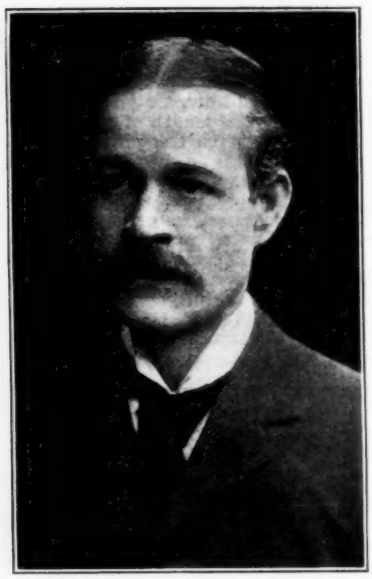
Lt.-Col. R. M. Barron retires.

Obituary.

ALPHONSO ELKIN CUMBERBATCH, M.B. LOND., F.R.C.S. ENG.

Mr. Cumberbatch died at his home near Rickmansworth on March 23rd from an attack of pneumonia. He was in his eighty-second year and had been living in retirement at Great Sarratt Hall since the end of the late war. His life covered almost exactly the development of otology as a special study. When the aural department at St. Bartholomew's Hospital was inaugurated in 1882 he was the first to be put in charge of it, in succession to Mr. John Langton who had up to then combined the duties of aurist with those of a general surgeon.

Cumberbatch graduated M.B. at the University of London in 1871 after a brilliant carer as a student, entering St. Bartholomew's Hospital as senior scholar and winning the Foster prize and the Kirkes gold medal. At the end of his period as house surgeon he took the F.R.C.S. Eng., and served as an administrator of anæsthetics before being appointed demonstrator of anatomy in the medical school. At that time anatomy was not a popular subject amongst students, but Cumberbatch succeeded in making his lectures and demonstrations attractive. The experimental appointment of aural surgeon was fully justified in the result, for although Cumberbatch's name is not memorised in any operation or instrument he had a remarkable delicacy of touch and did much to advance the surgery of the ear; many successive generations of students owing much to the teaching which they received in the scanty accommodation of the old and noisy surgery overlooking Smithfield Market. Later on he had the happiness of organising a new otological department in spacious quarters. His first contribution to the literature of aural surgery was a paper on paracentesis of the tympanic membrane for mucous accumulation, which appeared in the St. Bart.'s Hospital Reports, and was followed by many other useful and practical writings of the same sort. More connected literary work appeared in contributions to Walsham's Practice of Surgery and Heath's Dictionary of Practical Surgery. In addition to other onerous charges he was also aural surgeon to the Great Northern Hospital and to the National Hospital in Queen-square. His hospital work was done with conspicuous diligence in spite of private practice which ultimately became very large, and after exactly 25 years he resigned his post at St. Bartholomew's, only to be recalled to it in 1914 when, with the coöperation of his former assistant, Mr. L. A. Lawrence, he again took over the work of the department until the armistice. He was one of the founders of the Otological Society of the United Kingdom and for some years its President.



MR. CUMBERBATCH
In middle life.

Although Cumberbatch had survived almost all his contemporaries, the memory is still green of his ability as a conversationalist, with powers assisted by a memory of remarkable accuracy. He was a great admirer of Chinese pottery, possessing one of the best collections of the kind in the world. His devotion to animals of all kinds was a pleasing trait, and it is recalled that cats were apt to follow him about. In his younger days a great tennis player, often to be seen in rivalry with Sir Henry Butlin, an excellent skater, and a fair shot, later on in life he surrendered to golf and was recognised by opponents as a deadly putter. Dr. A. Baldock, who was his intimate for a period of more than 60 years, writes of his friend that "his keynote was 'thorough,' whether in work or play. Anything that he put his hand to he saw to it that it should be done well. He was a staunch friend and a gay companion whose loss will be felt irreplaceable by his older friends."

Mr. Cumberbatch married in 1881 Alice Lucy Moffatt, who died after 41 years of married life. He leaves four children, three daughters and one son.

JOSEPH RODERICK SUTHERLAND, M.B., B.SC. GLASG., D.P.H.

Dr. J. R. Sutherland's early death will be keenly felt in Lanarkshire where his work was well known and valued. He was educated at Glasgow High School and University, where he qualified in 1905, subsequently taking the M.R.C.S. (Eng.), D.P.H. (Camb.) B.Sc. in Public Health (Glasg.), and L.M. (Dub.). After holding resident posts at Blackburn Infirmary, at the Royal Infirmary, the Maternity Hospital, and the Eye Infirmary in Glasgow, and at Woodilee Asylum, he was appointed assistant bacteriologist to the Corporation of Glasgow, and in 1912 medical superintendent of the County Sanatorium, Stonehouse. After a period of war service in France he returned to tuberculosis work, confirmed in the conviction that his life's work would be devoted to the treatment of crippled children. After a long struggle, beset, we are told, with almost insuperable difficulties, he succeeded in establishing a county orthopædic hospital which took its place as one of the best in the country. "Although of a modest and retiring disposition," writes Dr. John Reid, "his tenacity, perseverance, and production of results succeeded in overcoming all active opposition. The possessor of a retentive memory and an alert analytical mind, his wide and varied knowledge of English literature made him a delightful companion. Literature and art were his chief recreations. His collection of first editions and well-chosen etchings were a delight to his friends. A yachting man of no mean ability, he spent his vacations exploring the lochs of the West Highlands."

His funeral, attended by representatives of all classes of the community, was evidence of the affection and esteem in which he was held by colleagues and patients.

SAMUEL HERBERT BURTON, M.B. LOND., F.R.C.S. ENG.

WE have to record the death at the age of 75 of Dr. Samuel Herbert Burton, the well-known Norwich surgeon, which occurred on March 30th at his residence, 49, St. Giles's-street, Norwich.

Samuel Herbert Burton was the son of a solicitor at Great Yarmouth, and received his medical education at University College, London, where he was a distinguished student, taking many honours at different stages in his graduation as M.B. Lond., and becoming also F.R.C.S. Eng. After holding all the resident appointments at University College Hospital, he became demonstrator of pathology in the medical school, but in 1878 he decided to return to his native

capital, Norwich, where the whole of his professional work was afterwards done. He became house surgeon to the Norfolk and Norwich Hospital, then surgical registrar, and in 1888 was appointed assistant surgeon to the institution. At the same time he became surgeon to the Jenny Lind Infirmary for Children and to the Norfolk and Norwich Eye Hospital. It is interesting to note that he lived and died in Norwich in the same house as the famous William Cadge who, a generation earlier, had occupied a position of high surgical distinction in the city. Burton was the direct follower of Cadge, whose career was necessarily closing just about the time of the former's election to the staff, and his services soon became in constant demand throughout the county both as a consultant and as an operator, his reputation being equally high as general surgeon, ophthalmologist, and accoucheur. At the time of his death he had been for some ten years on the consultant staff, but his period of active service covered no less than 40 years, and the institution gained as much from his administrative ability as from his scientific skill, for he was allowed on all hands to possess a first-rate business sense.

Burton was a deservedly popular man with the public as well as with his professional colleagues, and although his time was almost over-occupied by the demands of his practice, he was both a fisherman and a golfer and a good musician. He is survived by his widow, two sons, and two daughters.

JAMES McHUGH, M.B. LIVERP.

IT is with deep regret that we record the sudden death after a brief illness of Dr. James McHugh, of Waterloo. Educated at Liverpool Institute, he entered the medical school of the University in 1922. Possessed of a strong physique, good mental ability, and unusual powers of concentration, he readily achieved the highest honours of a student's career. After being awarded the Derby exhibition in medicine, he graduated in 1927 with first-class honours and distinctions in medicine and surgery. After 12 months' residence at the Royal Infirmary, first as house physician and then as house surgeon, feeling that general practice offered a closer contact with patients and a more human interest than consulting work, he became assistant to Dr. W. R. Rowlands, of Waterloo Park. In the course of his work he contracted pneumonia and died at the Royal Infirmary, after a week's illness, on March 31st. His death has brought to a premature close a career of great promise; he will be missed as a loyal colleague, a charming personality, and a faithful friend.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE.—The Manson Medal, awarded triennially, is to be presented this year to Sir Ronald Ross. It was founded in memory of Sir Patrick Manson in 1922 and has been awarded to Sir David Bruce and Senator Ettore Marchiafava. Qualifications for the medal are contributions of outstanding merit to knowledge of tropical medicine and hygiene.

The Chalmers Medal was founded in 1921 by Mrs. Chalmers in memory of her husband, Dr. Albert J. Chalmers. It is awarded every second year to a worker in the field of tropical medicine and hygiene who must be under 45 years of age on June 1st of the year of award. It is to be presented this year to Major J. A. Sinton, V.C., I.M.S. Previous awards have been made to Prof. E. Roubaud, Prof. Warrington Yorke, and Dr. H. Lyndhurst Duke.

Though the Manson Medal was founded in memory of Sir Patrick Manson, an attempt is being made to found a more substantial memorial in the shape of a permanent home for the society. To this end the Manson House Fund was started, and already subscriptions have brought in between four and five thousand pounds, while three thousand pounds have been promised on loan without interest. It is hoped that a sufficient sum will be raised to enable the society to purchase suitable premises which will form its headquarters. Sir Patrick Manson was the first president.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

THE EASTER RECESS.

PARLIAMENT adjourned for the Easter Recess on Wednesday, March 27th. The Royal Assent was given to the Local Government Act, the Factories and Workshops (Cotton Cloth Factories) Act, and other Acts. The House of Commons will reassemble on April 15th and the House of Lords on the 16th.

RECONSTITUTED CREAM BILL.

In the House of Commons on March 26th, on the motion for the third reading of the Reconstituted Cream Bill, a measure designed to prevent reconstituted cream being sold to the public as farm cream,

Mr. A. V. ALEXANDER said that to the general idea of the Bill the Opposition had no objection. If tradesmen in general were offering for sale as cream something which was not cream direct from the farm the public were entitled to know. Grave difficulties would, however, be set up for the tradesmen who would be using the reconstituted article to take the place of cream which they could no longer get in satisfactory quantities to keep for the length of time necessary for their manufacturing purposes. There was nothing in the Bill to prevent the public from believing that they were getting, either direct or in restaurants, actual cream, when what they actually were getting was really much inferior in its constituents to reconstituted cream. The Bill did nothing to protect the public against substitutes for cream which were most injurious to them.

Sir KINGSLEY WOOD (Parliamentary Secretary to the Ministry of Health) said Mr. Alexander had based his opposition to the Bill mainly on the ground that it did not apply to what was called synthetic cream. But that substance was already provided for under the Food and Drugs (Adulteration) Act, and therefore there was no need for any provision covering it in this measure. This Bill provided that the surplus milk of the country should be used, but used honestly. If milk was used to make what was known as reconstituted cream it was only fair that the general public should know what they were receiving and paying for.

The Bill was read the third time and passed.

HOUSE OF LORDS.

TUESDAY, MARCH 26TH.

LOCAL GOVERNMENT (SCOTLAND) BILL.

THE House went into Committee on the Local Government (Scotland) Bill, the Earl of DONOUGHMORE in the chair.

Transfer of Certain Functions to County Councils.

On Clause 2 Lord ARNOLD moved a new proviso to the effect that public health functions should not be transferred from a Royal burgh or from a burgh with a population of 10,000 and upwards unless not earlier than one year from the passing of the Act such a burgh was certified by the Central Department to be inadequately equipped for administering such functions. He said that there was no such provision in the English Bill. Under this Bill the conduct of health services was being taken away from small burghs and handed over to the county councils. In England 400 such small communities with populations under 5000 were administering identical, or very similar, functions.

The Earl of ONSLOW (Paymaster-General) said that it was quite true that these small burghs had done their work very well indeed, but the policy of the Bill was to transfer the wider functions to reconstituted county councils in order to make them of adequate resource and strength for their new duties. This amendment would cut at the roots of the Bill, because it aimed not only at efficiency, but at simplicity in administration.

The amendment was by leave withdrawn.

Medical Officers of Health and Sanitary Inspectors.

On Clause 35 Viscount YOUNGER OF LECKIE moved an amendment to make it compulsory that where there was a vacancy in the office of medical officer of health in a small burgh the county medical officer of health should be at once appointed to the vacancy.

The Marquess of SALISBURY (Lord Privy Seal) said that he did not deny that very often the arrangement suggested by Lord Younger might be by far the best one. But it seemed to the Government that it would be a pity to make it absolutely compulsory in every case, and some kind of power should be left to the Secretary of State to see that in particular cases where the circumstances were such that the appointment of a special man might be good for the burgh it should not be compulsory that the county medical officer should be appointed to the vacancy. If the noble

lord was not satisfied he would look into the point before the report stage and see if any more could be done.

Viscount YOUNGER OF LECKIE said that he thought that it was clearly desirable that the medical officer of health for the county should have supervision over the whole of these burghs. The continuation of these officers in small burghs was a great mistake and very expensive.

The amendment was by leave withdrawn.

On Clause 72, which enables the Secretary of State to make

Orders for Bringing the Act into Operation,

the Marquess of SALISBURY said that on the second reading of the Bill he had expressed his assurance that the Government were not averse to considering modifications of the clause as originally drafted. They were quite willing to strike out Subsection 1 which gave the Secretary of State power to modify this Bill in any respect he might hereafter think necessary in order to bring the machinery into operation. There was much criticism against such sweeping powers, and the Secretary of State had come to the conclusion that it was not really necessary to have that power at all. The Government were therefore willing to delete the subsection. Subsection 2 was not quite the same, as it provided power to modify other Acts of Parliament which might be difficult to adjust with respect to this particular Bill. In determining the protection given in that case the Government had naturally looked to the provision put by their lordships into the English Bill. That protection consisted of an affirmative resolution; the changes sought to be made by the Order of the Secretary of State did not operate except for a short time unless by affirmative resolution of both Houses of Parliament in favour of the change. In addition they did not desire that this power of modifying Acts of Parliament should be perpetual, and they provided that an Order of this kind should only be possible up to the end of 1930. What remained was the power to modify local Acts of Parliament, and the Government must adhere to the original proposals in that limited jurisdiction, because the local Acts of Parliament were very numerous and they had no means of ascertaining what they were.

Amendments were inserted in the Bill to carry out the intentions of the Government in accordance with Lord Salisbury's statement.

The Committee stage of the Bill was concluded and the Bill was reported as amended to the House.

HOUSE OF COMMONS.

TUESDAY, MARCH 26TH.

Deaths from Coal-gas Poisoning.

Mr. BOWERMAN asked the President of the Board of Trade whether his attention had been drawn to the fact that during the past 15 years deaths due to coal-gas poisoning had increased from 170 to 1142; that during that period the percentage of carbon monoxide, the chief poisonous contituent of coal-gas, had been raised from 7 per cent. to as much as 15 per cent., and in some cases to 20 per cent., such increase militating against the recovery of persons accidentally poisoned by gas; and whether he was prepared to give consideration to the recommendation of the committee appointed in 1921 to the effect that if the freedom from limitation in the use of carbon monoxide was proved to be accompanied by unexpectedly unfavourable results, the attention of Parliament should again be directed to the matter.—Sir P. CUNLIFFE-LISTER replied: My attention has been directed to the statistics of gas poisoning cited by the right hon. Member, and more particularly since the Report of the Committee on Carbon Monoxide in 1921. The situation has been carefully watched and relevant information collected. When reference is made to the number of deaths due to gas poisoning it is necessary to bear in mind how large a proportion are cases of suicide. But I think that it would be desirable that a small but experienced committee should review the developments which have taken place since the Pearce Committee sat in 1921; and I propose to appoint such a committee.

Outrages on Women in Trains.

Mr. MORRIS asked the Minister of Transport whether his attention had been drawn to the number of outrages committed upon women in non-corridor trains; and would he make representations to the railway companies that all passenger trains should have corridor carriages only.—Colonel W. ASHLEY replied: So far as my information goes deplorable incidents such as those to which the hon. Member refers are of rare occurrence. I am not prepared to press railway companies to discontinue entirely the use of non-corridor stock, but I will call their attention to the hon. Member's suggestion.

Milk for Public Health Purposes.

Mr. POTTS asked the Minister of Health whether he would introduce immediate legislation to amend the law so as to ensure that every purchaser of milk should be supplied with milk containing not less than a legal standard of milk fat and milk solids, other than milk fat, relating to services for the treatment of tuberculosis, maternity, and child welfare, &c., administered by public authorities under the Public Health Acts.—Sir KINGSLEY WOOD replied: Apart from any question as to the practicability of the proposal, my right hon. friend could not undertake to introduce legislation on the subject at the present time.

WEDNESDAY, MARCH 27TH.

The London Lock Hospital.

Viscountess ASTOR asked the Minister of Health what changes in administration he was proposing as a result of the recommendations of the report of the committee of inquiry into the London Lock Hospital; and whether the constitution of the board of management had been so changed as to give a greater choice of women.—Sir KINGSLEY WOOD replied: As indicated in reply to questions on this subject on March 14th the hospital is a voluntary institution, and reponsibility for carrying recommendations of the Committee into effect rests, not with my right hon. friend, but with the board of the hospital. My right hon. friend has not yet received specific proposals from the board as to their reconstitution, but he understands that they contemplate the inclusion of women on the board in future.

Public Health Conference at Zurich.

Mr. HARRIS asked the Minister of Health why he had refused to sanction the attendance of delegates from municipal councils to the forthcoming conference in Zurich of the Royal Institute of Public Health.—Sir KINGSLEY WOOD replied: My right hon. friend has given careful consideration to the application of the Institute in this matter and he does not feel satisfied that benefits commensurate with the considerable expense involved would be obtained by the attendance at the cost of the rates of delegates from local authorities at the conference.

National Health Insurance.

Mr. KELLY asked the Minister of Health the number of men, women, and young persons insured under the National Health Insurance Act at the end of 1928.—Sir KINGSLEY WOOD replied: The number for Great Britain is estimated to be 16,950,000, of whom 11,550,000 are men and 5,400,000 are women. These numbers include 790,000 persons who, having reached 65 years of age, have ceased to pay contributions under the Act and to be entitled to sickness and disablement benefits.

Grant to British Social Hygiene Council.

Captain CROOKSHANK asked the Secretary of State for the Colonies what, if any, conditions were attached to the grant of £500 made to the British Social Hygiene Council; and whether the grant was made after consultation with the Minister of Health.—Mr. AMERY replied: This grant is made to assist the Council in organising propaganda work in the Colonies, &c. Its employment is limited to certain specified services, such as the supply of films and medical and educational literature. Payments out of the grant are made only in reimbursement of certified expenditure on approved services. The grant has not recently been the subject of discussion with the Minister of Health, who has no responsibility for work of this kind in the Colonies.

Medical News.

SOCIETY OF APOTHECARIES OF LONDON.—At recent examinations the following candidates were successful:—

Surgery.—K. Girgis (Sect. II.), Manchester and Charing Cross Hospital; D. H. Haler, King's College Hospital; H. H. Lakin, Birmingham and London Hospital; and A. W. Tam, Singapore and Edinburgh.

Medicine.—A. Clark, Glasgow and London Hospital; J. M. Connor, St. Mary's Hospital; R. W. Goldsbrough, Leeds; and R. W. Scanlon, St. Thomas's Hospital.

Forensic Medicine.—R.W.Goldsbrough, Leeds; R. K. Nandlal, Birmingham; and K. M. Seedat, Charing Cross Hospital.

Midwifery.—I. M. Iddali and V. R. D. Lahanmi, Manchester; J. E. Moody, St. Mary's; Z. Risk, Birmingham; A. W. Tam, Singapore and Edinburgh; and E. O. Watson, St. Bartholomew's Hospital.

The Diploma of the Society was granted to the following, entitling them to practise medicine, surgery, and midwifery: J. M. Connor, K. Girgis, D. H. Haler, and R. W. Scanlon.

UNIVERSITY OF ABERDEEN.—At a graduation and diplomas ceremony on March 27th the following degrees were conferred:—

LL.D. (Hon.).—Major Walter Elliot, M.B., M.P.

M.D.—In absentia: *E. G. A. Don and *C. R. Philip.

In person: *W. E. McCulloch, A. W. Badenoch, H. B. Cook, Duncan McLellan, W. F. Munro, and S. S. Proctor.

*Awarded Commendation for Thesis.

M.B. Ch.B.—H. M. Trethowan (with Second-class Honours). W. H. Anton, N. D. Begg, Allan Brebner, Elizabeth R. Cairns, T. W. F. Cameron, Donald Fraser, H. C. R. Gunter, Ali Hassan, Grace Krogh, I. M. Munro, D. B. Robb, D. S. Smith, L. M. Watson, J. P. Weir, J. C. Wishart, and A. P. Youngson.
D.P.H.—R. J. Clark, Victoria C. Emslie, A. M. Fraser, and J. S. Harper.

UNIVERSITY OF DURHAM.—At a Convocation on March 22nd the following degrees were conferred:—
M.B., B.S.—Andrew Davis, Katharine M. Girling, J. A. Lennox, D. C. Livingston, William Mair, J. H. F. Pankhurst, J. H. Pool, J. W. M. Stevenson, and Howard Willcox.

At recent examinations the following candidates were successful:—

THIRD EXAMINATION FOR M.B., B.S.

Pathology and Bacteriology; Materia Medica, Pharmacology and Pharmacy; Public Health; Medical Jurisprudence.—R. H. Clayton.
The same subjects with General Principles of Therapeutics.—*J. K. Stanger, H. H. D. Anderson, A. G. Craven, Edna T. Everdell, P. N. Grinling, Lily Haugh, J. R. Hindmarsh, William Hunter, Kathleen N. W. Kearney, Gwendoline M. Langham-Hobart, W. D. McF. Millar, Thelma Mouat, Samuel Olswang, H. J. Peters, J. D. Rose, W. G. A. Swan, F. H. Taylor, and J. E. Wilson.
* Second-class honours.

Sir William Prout has relinquished his appointment as Consulting Physician to the Colonial Office and the Crown Agents for the Colonies. Dr. Philip Manson-Bahr has been appointed one of the Consulting Physicians in London.

FOOD EDUCATION SOCIETY.—Dr. Harry Campbell will lecture on Common Errors in Diet at 29, Gordon-square, London, W.C., at 3 P.M. on Wednesday, April 10th, and at week later at the same hour and place Mr. Charles Hecht, hon. secretary of the Society, will speak on Aids to Fitness.

CENTRAL ASSOCIATION FOR MENTAL WELFARE.—A Conference on Mental Welfare will be held, under the auspices of this Association, in the Central Hall, Westminster, on Thursday, April 25th, and Friday, the 26th. The Conference will be opened by Mr. Neville Chamberlain, the Minister of Health, and the speakers will include Mr. L. G. Brock, chairman of the Board of Control; Dr. A. F. Tredgold, and Dr. Ralph Crowley. Application for the full programme and for tickets should be made to the hon. secretary of the Association, 24, Buckingham Palace-road, London, S.W. 1.

HOSPITALS AND MOTOR ACCIDENTS.—In consequence of a suggestion made by Sir Arthur Stanley the Royal Automobile Club is organising a fund for the benefit of hospitals especially affected by road accidents. The money will be distributed without deductions for expenses in collaboration with the British Hospitals Association.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.
MONDAY, April 8th.—4.30 P.M., WAR. Annual General Meeting: Election of Officers and Council. Discussion on Functional Diseases of the Nervous System. Opener: Colonel J. C. Kennedy, R.A.M.C. To be followed by Surgeon Rear-Admiral E. T. Meagher, R.N., and Squadron Leader M. L. Burton.
TUESDAY.—5 P.M., ORTHOPÆDICS. Papers: Mr. W. H. Ogilvie: Recent American Papers on Bone Tumours. Mr. R. Watson-Jones: Wrist Dislocation with Associated Nerve Lesions. To be followed by a discussion. 8 P.M., PSYCHIATRY. Joint Meeting with the British Psychological Society (Medical Section). Discussion: The Rôle of Anxiety in the Psychoses and Psychoneuroses. Speakers: Dr. Ernest Jones, Dr. H. Yellowlees, Dr. R. D. Gillespie, and others.
THURSDAY.—8.30 P.M., NEUROLOGY. Discussion on Disseminated Encephalomyelitis.

SOCIETY FOR THE STUDY OF INEBRIETY.
TUESDAY, April 9th.—4 P.M. (in the Rooms of the Medical Society of London, 11, Chandos-street, Cavendish-square, W.), Dr. John Davy Rolleston will open a discussion on Alcohol in Therapeutics.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL NORTHERN HOSPITAL, Holloway-road, N.
TUESDAY, April 9th.—3.15 P.M., Mr. A. M. Zamora: Hoarseness.

CENTRAL LONDON THROAT, NOSE AND EAR HOSPITAL, Gray's Inn-road, W.C.
WEDNESDAY, April 10th.—1.30 P.M., Examination and Diagnosis of the Nose.
FRIDAY.—4 P.M., Mr. A. Ryland: The Musculature of the Vocal Cords.

ROYAL DENTAL HOSPITAL OF LONDON POST-GRADUATE LECTURES, Leicester-square, W.C.
WEDNESDAY, April 10th.—6 P.M., Mr. Bowdler Henry: Lecture Demonstration on Diathermy in Dental Surgery.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.
MONDAY, April 8th.—2.30 to 5 P.M.: Medical, Surgical, and Gynæcological Clinics. Operations.
TUESDAY.—2.30 to 5 P.M.: Medical, Surgical, Throat, Nose and Ear Clinics. Operations.
WEDNESDAY.—2.30 to 5 P.M.: Medical, Skin, and Eye Clinics. Operations.
THURSDAY.—11.30 A.M.: Dental Clinics. 2.30 to 5 P.M.: Medical, Surgical, and Ear, Nose and Ear, Nose and Throat Clinics. Operations.
FRIDAY.—10.30 A.M.: Throat, Nose and Ear Clinics. 2.30 to 5 P.M., Surgical, Medical, and Children's Diseases Clinics. Operations.

ANCOATS HOSPITAL POST-GRADUATE LECTURES, Mill-street, Manchester.
THURSDAY, April 11th.—4.15 P.M., Dr. Twining: X Ray Findings in Diseases of the Chest.

MANCHESTER ROYAL INFIRMARY POST-GRADUATE COURSE.
TUESDAY, April 9th.—4.15 P.M., Mr. J. P. Buckley: Pain after Food.
FRIDAY.—4.15 P.M., Mr. E. D. Telford: Demonstration of Surgical Cases.

Appointments.

FERGUSON, J., M.B., B.Ch. R.U.I., D.P.H., has been appointed County Medical Officer for Surrey.
MCMAHON, A. D., M.B., B.Ch. N.U.I., D.P.H., County Medical Officer of Health for Carlow.
ROBERTS, D. R., M.B. Durh., Certifying Surgeon under the Factory and Workshop Acts for the New Tredegar District of Monmouth.
Salford Royal Hospital: THORNTON, T., M.B., Ch.B. St. And.; and MAXWELL, R. J. C., M.B., Ch.B. Belf., House Surgeons.

Vacancies.

For further information refer to the advertisement columns.

Aberdeen Royal Infirmary.—Jun. Asst. Ophth. Surg.
Altrincham General Hospital.—H.S. At rate of £105.
Ascot Heatherwood Hospital.—Res. Asst. M.O. £300.
Ashton-under-Lyne, District Infirmary.—H.S. At rate of £150.
Ayr County Hospital.—Sen. Res. H.S. At rate of £100.
Bath, Royal United Hospital.—Asst. H.S. At rate of £100.
Bedford County Hospital.—H.S. At rate of £175.
Birmingham, Selly Oak Hospital.—Cas. O. At rate of £200.
Bolingbroke Hospital, Wandsworth Common, S.W.—H.P. At rate of £120.
Bombay, Goculdas Tejpal Hospital.—Hon. Surgeon. Rs.150 per mensem.
Bootle County Borough.—Asst. Sch. M.O. &c. £600.
Brighton, Royal Sussex County Hospital.—Cas. H.S. £120.
Bury St. Edmunds, West Suffolk General Hospital.—H.S. £150.
City of London Hospital for Diseases of the Heart and Lungs, Victoria Park, E.—H.P. At rate of £100.
Colchester, Essex County Hospital.—H.S. £175.
Connaught Hospital for Walthamstow, &c., Orford-road, Walthamstow, E.—Res. H.P. and Res. H.S. Each at rate of £100.
Denbigh, North Wales Sanatorium.—Third A.R.M.O. £250.
Derby, Derbyshire Royal Infirmary.—H.P. £150.
Gravesend and North Kent Hospital.—Jun. H.S. £80 to £200.
Guy's Hospital Dental School, S.E.—Director of the Dental Prosthetic Laboratory. £600.
Halifax Royal Infirmary.—Third H.S. At rate of £100.
Hamilton County Orthopædic Hospital, Stonehouse.—Res. M.O. £600.
Hampstead General and North-West London Hospital, Haverstock Hill, N.W.—H.S., Cas. M.O. Also Cas. Surg. O. Each at rate of £100.
Hospital for Consumption, &c., Brompton, S.W.—Asst. Res. M.O. £150. Jun. H.P. at Frimley Sanatorium. £100. Also H.P. £50 for six months.
Huddersfield Royal Infirmary.—Jun. H.S. £150.
Hull Royal Infirmary.—Hon. Phys.
Isleworth, Warkworth House Institution, &c.—Res. Asst. Med. Supt.
Leicester Royal Infirmary.—Two Surg. Dressers. 10*s.* 6*d.* weekly.
Liverpool City.—Asst. City Bacteriologist. £600.
Liverpool Heart Hospital.—Hon. Asst. Phys.
London Female Lock Hospital, 283, Harrow-road, W.—H.S. At rate of £150.
Manchester, Ancoats Hospital.—Res. Surg. O. £200.
Manchester Hospital for Consumption, &c.—Hon. Asst. Anæsthetist.

Manchester, Salford Royal Hospital.—Res. Surg. O. At rate of £200.
Manchester, Victoria Memorial Jewish Hospital, Cheetham.—Jun. H.S. At rate of £125.
Metropolitan Hospital, Kingsland-road, E.—Sen. H.P. and H.S., Jun. H.P. and H.S. Also two Cas. O.'s. Each at rate of £100.
Miller General Hospital, Greenwich-road, S.E.—Cas. O. £150.
Newcastle-upon-Tyne, University of Durham College of Medicine.—Asst. in Public Health Labs., &c. £350–£450.
New Delhi, India, Lady Hardinge Medical College.—Prof. of Anatomy. Rs. 750 a month.
Northampton Education Committee.—Asst. School Dentist. £450.
Norwich, Norfolk and Norwich Hospital.—H.P. £120.
Nottingham, Bagthorpe Institution and Infirmary.—Res. Asst. M.O. At rate of £300.
Preston, High Carley Sanatorium, near Ulverston.—Asst. Tuber. M.O. £350.
Preston and County of Lancaster, Queen Victoria Royal Infirmary. Hon Asst. S. and Hon. Asst. P.
Prince of Wales's General Hospital, Tottenham, N. — Res. Sen. H.P. Sen. H.S. and Special H.S. Each at rate of £120. Also Jun. H.P. and Jun. H.S. Each at rate of £90.
Queen's Hospital for Children, Hackney-road, E.—Surg. to Ear, Nose and Throat Dept. Cas. O. At rate of £100. Also H.P. At rate of £100.
Reading, Royal Berkshire Hospital.—Med. Reg.
Redhill, Surrey, Royal Earlswood Institution.—Jun. Asst. M.O. At rate of £250.
Romford Union, Oldchurch Hospital.—Res. 2nd Asst. M.O. £250.
Royal Air Force.—Medical Officers.
Royal London Ophthalmic Hospital, City-road, E.C.—Gifford Edmonds Prize in Ophthalmology. £100.
Royal Waterloo Hospital for Children and Women, Waterloo-road, S.E.—H.S. At rate of £100.
St. Andrews Hospital, Devons-road, Bow, E.—Two Asst. M.O.'s. Each £350.
St. John's Hospital, Lewisham, S.E.—Res. M.O. £200. Res. Cas. O. and Jun. H.S. Each at rate of £100.
Saint Mark's Hospital for Cancer, &c., City-road, E.C.—H.S. At rate of £75.
Sheffield Union Hospital, Firvale.—Res. Asst. M.O. £250.
Sunderland Union.—District Medical Officer. £185.
Swansea Hospital.—H.S. £150.
Victoria Hospital for Children, Tite-street, Chelsea, S.W.—Hon. P. or S. for Diseases of the Skin.
Wakefield, Clayton Hospital.—H.S. £150.
Warrington Infirmary and Dispensary.—H.P. £150.
West End Hospital for Nervous Diseases, Welbeck-street, W.—Two Hon. Anæsthetists.
Western Skin Hospital, 44, Hampstead-road, N.W.—Hon. Asst. Dermatologist.
Winchester, Royal Hampshire County Hospital.—Hon. Phys.

The Chief Inspector of Factories announces the following vacant appointment for Certifying Factory Surgeon :—Lytham (Lancs.).

The Secretary of State for the Home Department gives notice of a vacancy for a Medical Referee under the Workmen's Compensation Act for the Bradford, Keighley, Skipton, and Settle County Courts. Applications should reach the Private Secretary, Home Office, Whitehall, S.W., not later than April 17th.

Births, Marriages, and Deaths.

BIRTHS.

ANGUS.—On March 27th, at Bewick-road, Gateshead, the wife of Dr. Alan Angus, of a daughter.
BARDSLEY.—On March 27th, at Carlton-road, Putney, the wife of Dr. P. E. Bardsley, of a son.
BENJAMIN.—On March 27th, the wife of Dr. Alva Benjamin, of a daughter.
FETTES.—On March 22nd, at Randolph-crescent, Edinburgh, the wife of Major D. Fettes, R.A.M.C., of a son.
HUBBLE.—On March 23rd, at Derby, the wife of Douglas Hubble, M.B., B.S., of a daughter.
SMITH.—On March 20th, at "Cullingworth," St. Peter's-in Thanet, the wife of R. Wylie Smith, M.B., B.Chir., of a daughter.
SNELL.—On March 28th, at Altrincham, Cheshire, to Evelyn, wife of Norman Snell, M.D.—a son.

MARRIAGES.

MINDE—WILSON.—On March 9th, at Chelsea Register Office, Dr. Max Minde, of Horrsal, Cape Town, and London, to Valerie Frances Somerville Wilson, of Arlington, Johannesburg, South Africa.

DEATHS.

ATKINS.—On March 25th, suddenly, at Chelston Manor, Torquay, Frederick Durnford Atkins, M.B., B.S., M.R.C.S., L.R.C.P.
BURTON.—On March 30th, at St. Giles-street, Norwich, Samuel Herbert Burton, M.B., F.R.C.S. Eng., J.P., aged 75.
HEDDEN.—On March 28th, at South Bank, Bideford, Richard Hedden, M.R.C.S. Eng., L.R.C.P. Lond., L.S.A., aged 68.
HUNT.—On March 22nd, at Maidenhead, Edwin Guy Hunt, M.D., of Erpingham-road, Putney.
STEELE.—On March 25th, at Clifton, Bristol, Lieut.-Colonel W. H. Steele (retired), R.A.M.C.
WHITE.—On Good Friday, Edward Augustine White, M.B., B.S., M.R.C.S., L.R.C.P. Lond., aged 25 years.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

MANIPULATION OF THE BACK.*

BY JAMES MENNELL, M.D. CAMB.,
SENIOR MEDICAL OFFICER OF THE KENSINGTON CENTRE FOR PHYSICAL TREATMENT, BRITISH RED CROSS SOCIETY.

THE Clinic of the Kensington division of the British Red Cross Society's Centre for Physical Treatment was used originally during the war for the treatment of soldiers. Later on, it became a clinic for the treatment of pensioners. When these services were no longer required, those responsible decided that, if it had held a useful place in the treatment of soldier and pensioner, it might surely do so in the treatment of the civilian populace.

The Kensington Red Cross Centre.

Like other institutions of a similar kind, it opened with a few—literally two—patients. During the seven years of its existence there have been 4186 patients on the books. There has been an average daily attendance of 88 patients for treatment during the last six months, and the average number of new cases received has been 21 15 per week during this period. The clinic has grown in part, of course, through the loyal support of some of the practitioners of the neighbourhood, but for the most part patients come through mouth to mouth recommendation from former patients—though I would emphasise the fact that in no circumstances is anyone treated at this clinic unless he or she brings an introduction from a qualified medical practitioner. Those who are in a position to pay for expert advice and treatment elsewhere are also refused, and at the other end of the scale those who cannot pay the minimum fees without financial inconvenience. The comparatively well-to-do and the ordinary hospital out-patient are thus excluded. Between these two classes there is an enormous mass of the populace who cannot afford fees for private treatment, and yet who would shrink from attending hospital, and it is for the sake of these that the clinic exists, and for those who, but for the facilities we give for evening treatment, would be faced with the choice between going without treatment or going on the "sick-list." At the present time there is a loss of about £1000 a year, every penny of which is raised by the Kensington Division of the British Red Cross Society: and, when it is remembered that the wealth of Kensington is far from what it used to be, the courage of those who have made themselves responsible for the clinic becomes obvious.

Every patient who attends there is treated in every respect as an ordinary private patient. The time for consultations with the physician-in-charge is fixed, and the masseuse then reserves a definite time for the patient to attend for treatment. Every patient is treated in a cubicle and is interviewed in just the same way as would be an ordinary private patient. On alternate months throughout the winter a meeting is held at which some one branch of the professional activities carried on at the clinic is described, and all qualified medical practitioners are welcome to attend these meetings.

Physico-therapy of the Spinal Column.

I realise that many people will consider that I am treading on unhallowed ground when claiming manipulations of the spine as a therapeutic agency. There exists in the lay mind a certain amount of confusion of thought about the back. There is something mysterious about it, doubtless connected with the fact that so important a part of the main central nervous system is situated in this region. It is not easy for the layman to realise the difference between the spinal column and the spinal cord, and I am afraid that the power to differentiate between these two has, to a certain extent, pervaded the ranks of our own profession. The spinal cord is part of the central nervous system: the spinal column is part of the skeletal system. Apart, therefore, from considering the back in terms of the central nervous system, the physicotherapist regards it merely in the light of a series of bones and joints. The joint surfaces are of an extremely complicated nature in many situations, particularly in the upper part of the neck and in the pelvic region.

Everyone is, I think, agreed that the spinal column, in so far as it consists of bone, is liable to all the ills of bone in other parts of the body. For instance, we recognise without surprise, malignant disease, tuberculous disease,

* Being the substance of a lecture demonstration on the occasion of the seventh anniversary of the Kensington division of the British Red Cross Society's Centre for Physical Treatment.

osteitis deformans, and other bone diseases, but somehow or another the possibility that the joints in the back should suffer in the same way as joints in any other part of the body seems to have been all too frequently overlooked. For example, we are all of us familiar with, and diagnose without question, a synovitis of the knee following on a severe twist. Surely it is possible that a similar lesion should produce a similar condition in one of the spinal joints, and yet, so far as I am aware, I never yet remember hearing the diagnosis given, or even suggested, in the case of a spinal joint. Moreover, we all know and recognise the pain and disability that adhesions may cause in a shoulder-joint, and we take the utmost care and patience to remedy them; yet if a similar condition occurs in one of the spinal joints, the chances are that the patient will be expected to work off his symptoms, while comparatively few are ready to prescribe the treatment which they would so readily prescribe for the knee—namely, that the adhesions should be broken down by joint manipulation under an anæsthetic.

The whole situation seems to me to be irrational. If once we admit that the spinal column consists of bones and joints, we must admit that these joints are liable to ordinary strains of accident; and, if we once admit this, we must admit also the essential desirability of making a diagnosis in the first place, and of providing suitable and adequate treatment in the second. We all know how utterly and totally impossible it is to remedy certain cases of stiff shoulder or stiff knee, except by manipulation. So, too, there are countless cases of back trouble where manipulation alone offers a chance of relief, and the tragedy is that no other treatment can possibly be of any avail.

Where a joint is concerned there are only three things which it is possible to do with it. One is to fix it, the second is to move it, and the third course lies between these two—namely, to limit the movement of the joint by support. True, a great deal can be done, by encouraging muscle action, to build up the strength of the muscles which control the movement of joints; but those of you who have tried to build up the strength of a quadriceps which controls a knee, in which full extension cannot be obtained, know only too well the futility of the attempt. Similarly, it is irrational to suppose that, if there is a painful limitation of movement of a joint in the back, the patient of his own volition is able to build up once more the strength of the muscles which control that joint.

The Locking of Joints.

Now we come on to much more delicate ground, and this involves the question as to whether it is possible for a joint to lock or not. I think that few of us who devote any great part of our professional life to the treatment of injuries will fail to accept the fact that locking, to a greater or less degree, can take place in many joints. One of the classical examples is recognised—the case of the "pulled elbow," in which the radius is pulled downwards in the long axis of the forearm, until either the superior or inferior radio-ulnar joints become partially locked. The treatment, of course, is simple, and consists of pushing the radius up again, and this is one of the "five-minute miracle cures" which so delight the heart of the unqualified practitioner of joint manipulation. The same applies to wrist injuries at games like tennis or golf, and more rarely to one of the conditions which are so commonly classed under the generic term of "tennis-elbow." Frequently the most disabling conditions in elbow or wrist, so far as the continued practice of the game in question is concerned, can be relieved instantaneously by manipulation. If the lesion is seen in the early stages, it is quite impossible that adhesions should have formed, and when manipulation cures in these early stages it cannot be due to the breaking down of adhesions. There is no demonstrable dislocation either clinically or on X ray examination, and we can therefore only conclude that, in these cases of recent injury in which manipulation is immediately successful in restoring painless movement, the condition must have been due to a locking of two joint surfaces, and that this locking is freed by the manipulation. If this applies to the joints of the extremities, a most casual glance at, shall we say, the lumbo-sacral junction will serve to show how far more likely is this locking to occur in this situation than in many of the joints of the extremities. This frequently accounts for that endless tale of patients who suffer from backache and, having failed to secure relief through the more recognised channels, have been driven to consult the bone-setter or the osteopath, and have received almost, if not quite, immediate relief.

I do not mean to say that all cases of backache can be relieved by manipulation. The only point I wish to stress is this, that we cannot wilfully blind ourselves and deny that cases do exist in which the symptom of pain in the back is cured by manipulation; and if these do exist, it is our duty to try to distinguish these cases, and to prescribe the only treatment which can possibly be of benefit. Since the war, many discussions have been held upon backache due to various lesions or conditions in the region of the sacro-iliac joint, or of the lumbo-sacral junction. In America the literature on these subjects is voluminous. Quite irrationally, however, as it seems to me, the possibility of trouble arising from acute or chronic conditions in the joints higher up in the back has been entirely ignored.

Take, for example, cases of spasmodic torticollis in the adult—that terribly distressing condition which one usually only encounters in those of advancing years. Life to these poor sufferers is rendered wellnigh intolerable, and the only thought that they have to comfort them is that life itself cannot continue very much longer. On more than one occasion I have been allowed by the patient to manipulate the neck under a general anæsthetic, simply because there was, in the patient's mind, the distinct hope that the operation would have a fatal termination. Yet I have never manipulated the cervical spine without earning the gratitude of the patient, and this in spite of the fact that cure has sometimes been impossible, and that I have only been able to secure a degree of alleviation.

It is now a recognised thing among a few medical men to prescribe mobilisation under a general anæsthetic as routine treatment for patients suffering from certain types of pain in the lower part of the back; yet there must be at least as great a number of people who drag on day after day in misery merely for lack of similar treatment for the cervical spine. What is true of the cervical spine is true only in lesser degree of the joints throughout the back.

Rest and Mobilisation.

One of the great difficulties in treating cases of recent injury of the back is to secure adequate rest from strain. In the lumbar region, for instance, complete rest is nearly impossible, except on a plaster bed. It is true that, with the knees drawn up over a pillow, a certain amount of relief can be secured; but if the pillow is a shade too high or a shade too low some element of strain must creep in. All of us are probably aware of the waywardness of a pillow, and the impossibility of maintaining accurate adjustment for any length of time. Moreover, this degree of rest can only be secured while the patient is on his back. Any attempt to lie on the side must inevitably disturb complete rest to some degree

Few of us would expect a synovitis of the knee to clear up with any rapidity if the joint was allowed to exercise the weight-bearing function. Surely, then, it is not surprising when we realise the immense difficulties of preventing lumbar or sacro-iliac joints from bearing weight, that these joints fail to recover rapidly from a similar condition.

It is little wonder that many of these cases of back strain develop adhesions; and, as we know from our experience with other joints, if adhesions are present the correct treatment is by mobilisation. Few of us would imagine that we should be likely to restore a patient whose trouble is due to adhesions in the knee-joint by ionisation, radiant heat, diathermy, massage, or indeed by any treatment other than manipulation. Is it rational to suppose that what it is impossible to effect in the knee-joint we should succeed in performing in one of the joints of the back

The possibility of pain radiating into more distant parts because one of these joints is at fault must be considered. We know, for example, that if a patient comes to us complaining of pain in the knee, and on examination we were unable to discover any sign in the knee itself to account for the symptoms, we promptly examine the hip, and we recognise that pain in the knee is often the first sign of some form of disease of the hip-joint. Why, then, should we fail to realise that pain may be set up in some more distant part as a direct result of a lesion of one of the joints of the spine? Many people now realise the possibility of pain being referred down the leg as a result of a lesion of the sacro-iliac joint, but comparatively few are ready to believe in a traumatic origin—for example, of pleurodynia. Anyone, however, who has experienced the dramatic cure of cases of this type as the result of manipulation must, I think inevitably become a firm believer in the possibility of a locking of a costo-vertebral joint as a cause of most acute symptoms. Yet is it comparatively rare for us to recognise as a cause, shall we say, of brachial neuritis, some corresponding lesion of one of the cervical joints.

I well remember one case which gave me a very useful lesson on the possibility of the occurrence of referred pain as a result of trouble in the upper cervical spine. A young boy had a mild attack of influenza, and for some reason, quite unknown, woke up one morning completely unable to bend his head forwards. On palpation and on manipulation there was definite pain between the third and fourth cervical vertebræ. I was totally unable for a time to account for the fact that there was a considerable amount of pain and discomfort in the neighbourhood of the lower ribs on the same side as the pain was felt in the neck, yet it seemed apparent that the simultaneous origin of the two symptoms must have some common factor. It was only when I remembered the posssibility of irritation of the

phrenic that I was able to establish the connexion between the two.

Occipital headache, too, is frequently due directly to stiffness in the cervical spine, and can often be relieved almost, if not quite, by manipulation alone. The same may be said of pain throughout the distribution of the branches of the superficial cervical plexus, and we have just witnessed a striking example at this clinic. For over nine months one of our patients had had such severe pain in the side of the face (via the cerviculo-temporal nerve) that she had uninterruptedly worn a thick black velvet shield. Manipulation under ether immediately secured entire relief.

As we descend further down, we may find the pain radiating into the arms. In the thoracic region the nerves of the chest wall may be affected. There is one particular type of this pain to which special attention may be drawn since it is a symptom which earns, for him who can remove it, intense gratitude.

Typical Cases.

Most of us have had women patients who come complaining of pain in the breast, in an agony of fear lest this should be the first sign of cancer. On examination of the breast nothing abnormal is to be discovered, and reassurance is given. When the pain persists, the patient naturally becomes filled with the grave doubts, usually imagining that even if cancer is not already present, the pain must be due to the imminent onset of the disease. Frequently the whole thing can be cleared up in a short time as the result of manipulation.

This circumstance affords an example of the type of case which leaves little cause for wonder that some of the poorly trained and ignorant manipulators claim to be able to cure cancer in the breast as a result of manipulative treatment. The patient believes firmly that this is the only possible cause of the pain; and, when relief follows treatment, both patient and manipulator are readily deceived into thinking that another case of cancer has been cured.

Many unjustifiable claims of having succeeded in curing a patient of indigestion have a similar origin. The low intercostal nerves supply the abdominal wall. Many people, and not perhaps particularly laymen, are liable to attribute pain and tenderness in the epigastric region solely to indigestion. Yet pain will inevitably be felt in this region if there is any condition present at the lumbo-thoracic junction which causes irritation of the twelfth thoracic nerve. The patient, as a rule, has diagnosed his own case as being due to indigestion; only too often this opinion has been backed up by his medical adviser. When no relief is derived from the usual remedies, resource is had to the manipulator; and if, as so often happens, relief is secured, surely both patient and osteopath have some excuse at any rate for claiming that the indigestion was cured by the manipulation. The relief has, of course, followed, not the cure of indigestion, but only the cure of a nerve irritation.

I well know the difficulty of trying the convince a patient who has suffered in this way that I have not succeeded in curing him of indigestion. Personally, I stoutly repudiate the claim, believing that all I have done is to give relief from a pain which the patient has, quite wrongly, attributed to indigestion.

It is doubtless also a similar reason that accounts for the alleged cure of many cases of acute appendicitis by manipulation. We must always remember that McBurney's point is situated half-way down the line drawn from the umbilicus to the anterior superior spine of the ilium. It is seldom recognised that Bear's sacro-iliac point is situated two inches down this line from the umbilicus, and that therefore these two diagnostic points are often separated only by an inch or so. Pain and tenderness in the right iliac fossa is by no means confined to appendicitis. Local tenderness, reflex contraction of the abdominal muscle on pressure, and the posture of the thigh (semi-flexed) are symptoms which may be caused either by a traumatic lesion of the sacro-iliac joint or by appendicitis. In the former condition, however, there is no rise in temperature, little, if any, quickening of the pulse, and, above all, no typical alteration of facial expression; but acute tenderness is felt over the ligaments of the joint when pressure is exerted from behind, a tenderness which is absent in cases of appendicitis.

When we take all these facts into consideration we can readily understand the reason why pain in the right iliac fossa is so often not relieved by removal of the appendix, and we can also, I think, realise that pain in the left iliac fossa need not of necessity be attributed to the ovary.

In this connexion, too, it is only right to refer to the diagnosis so frequently made of lumbago or sciatica. In a clinic such as this, case after case comes to us, week after week, labelled lumbago or sciatica; but here we have grown to regard these names as nearly meaningless. All we infer from the diagnosis is that the patient has pain in the back or leg, and that it is "up to us" to discover the cause. It would be no exaggeration to say, of a hundred consecutive cases sent to us as suffering from sciatica, not more than one or two owe their symptoms to a true sciatica; the remainder are cases of referred sciatica, if indeed the pain involves the distribution of the sciatic nerve at all.

Conclusion.

Let us try to summarise the lesson to be learned by the working of such a clinic as this, with the experience of seven years of uninterrupted work behind us. The first and foremost is, I think, that the medical profession as a whole must review their attitude to the spinal column. It should no longer be regarded merely as the bony home of the spinal cord. We must learn to realise that it consists of bones and joints; that those joints are complicated, and that their mechanism is extremely intricate. Then, too, we must realise that, if these joints exist, they must of necessity be subject to the same ills as are other joints throughout the body, and that they should therefore receive the same scientific consideration and treatment that has been applied to the joints of the extremities. If we recognise and accept the fact that any joint of the extremities can cause symptoms which require manipulation for their relief, we must admit that the same applies to the joints of the spinal column, and no longer withhold from our patients the benefit which manipulation—and manipulation alone—can bestow upon them.

FINGER-PRINTS.

A NEW edition of Sir E. R. Henry's "Classification and Uses of Finger-Prints," which has been issued by H.M. Stationery Office (pp. 142, 3s.), brings the total of issues up to six since this useful book was first published in 1900. For those who are engaged in the identification of finger-prints it should be studied in conjunction with the smaller book, "Instructions in the Method of Taking Finger-Prints," also published by H.M. Stationery Office. We learn that on account of its effectiveness, simplicity of working, certainty, and inexpensiveness, the system has now been adopted by practically all civilised States, as is shown by a table of figures compiled at New Scotland Yard. Mr. Charles S. Collins, formerly superintendent of the Finger-Print Branch of the Criminal Record Office, has added an interesting note explaining the method adopted in London. Finger-prints are serviceable not only for identification in criminal cases, but for authentication of certificates of health in the Far East and for the registration of native and Chinese-labour. It is now 50 years since Dr. Henry Faulds, who has a good claim to be regarded as the inventor of the finger-print system of investigation, issued a schedule containing outlines of the ten fingers to be filled in with imprints from the palmar pads of each last joint in the serial order of the fingers. These forms were done on copper-plate in Japan, where he was in charge of Tsukiji Hospital, and were circulated freely to explorers, missionaries, ship surgeons, coroners, magistrates, judges, and chief constables. Dr. Faulds's idea was to lay the foundation of a scientific system of personal identification. He intended the records to include soldiers and sailors, in view of the possibility of sudden death and burial without identification, to help in the recovery of lost children, to secure recognition of unknown dead bodies, and of persons who had lost knowledge of their personality by illness. In 1905 Dr. Faulds published a "Guide to Finger-Print Investigation," in which he emphasised his feeling that evidence of this kind can only be kept free from fallacy if submitted to the scientific expert. This guide has long been out of print, and it is Dr. Faulds's earnest wish not to leave the scene before he has been able to issue an expanded and amended edition of the book.

A RECORD OF PHRENOLOGY.[1]

Mr. J. Millott Severn has published privately the story of his life, incorporating his experences as a phrenologist, and it appears fittingly in the centenary year of the demise of Francis Joseph Gall, who is generally accepted as the founder of the cult. The biography gives an interesting description of the life of the author as a child hand on a farm, as a pit-boy, and as a joiner, before the actual experiences of a working phrenologist are reached. These experiences are in many ways quite interesting, while the chapter on the founders of phrenology may be of service to the medical historian. Modern medicine would not, of course, form the same estimate of the importance of phrenology that its followers claim, but there is no doubt that a hundred years ago many medical men believed in the doctrines of Gall and John Gaspar Spurzheim, and that the ideas which they fostered have taken a more scientific aspect with the development of medicine. Those who are sceptical on this point may be referred to early issues of THE LANCET.

[1] The Life Story and Experiences of a Phrenologist. Brighton Phrenological and Mental Science Institution, 68 and 69, West street, Brighton. Over 500 pages; 50 chapters; 30 illustrations. 12*s.* 6*d.*

MEDIÆVAL WILLS.

On Dec. 8th, 1784, Samuel Johnson made his last will and testament. A codicil was added next day, in which he left "to Dr. Heberden, Dr. Brocklesby, Dr. Butter, Mr. Cruickshank, the surgeon who attended me, Mr. Holder, my apothecary, and others, each a book at their election, to keep as a token of remembrance." The book that was chosen by Cruickshank was Clarke's edition of Homer. Johnson did not treat his books very kindly, and it is said that Garrick disliked lending him any of his books as they were returned with marginal notes and often in a dog's-eared condition by the great lexicographer. Such marginal notes would add much to the value of any book to-day.

The will of Matthew Hutton, Archbishop of York, made in 1605, contains the following bequest: "Item. I gyve to my ancient good friend, Mr. Christopher Myller, Physician, Paradox Medicorum, set forth by Fuchius." The work in question was by Leonhard Fuchs (1501–1566), and its full title is as follows: "Paradoxorum medicinae libri tres, in quibus sane multa a nemine hactenus prodita, Arabum aetatisque nostrae medicorum errata non tantum indicantur, sed et probatissimorum autorum scriptis firmissimisque rationibus ac argumentis confutantur. Obiter denique hic Sebastiano Montuo medico Rivoriensi respondetur, ejusque annotatiunculae velut omnium frigidissimae procsus explodentur." This work was published in folio in 1535 at Basle. Twenty years later two editions were published in duodecimo at Paris. Copies of the 1555 editions are in the library of the Royal College of Surgeons of England and in that of the Medical Society.

In 1585 Thomas Tobie, of Newcastle, barber-surgeon, made his will. In it occurs the following bequest: "I geve my son George Tobie to my frend Rauffe Tate, with the booke of Marters, the Erball, Johannis de Vigo, Bullin's booke, with a metall pott and a bason." Of these books, the marters is John Fox's "Acts and Monuments of these Latter and Perillous Days," &c. (London, First edition, 1562); the Erball is possibly William Turner's Herbal, printed at Cologne in 1568, in folio; John of Vigo's "Works of Chirurgerye," was translated by Bartholomew Traheron, London, 1543, in folio; while Bullin's booke is either William Bullein's "Government of Healthe," London, 1558, or his "Bulwarke of Defence against all Sickness, Sornes and Woundes that dooe daily assaulte Mankinde," London, 1562. Another barber-surgeon, of Newcastle, George Fuister by name, made his will in 1592 and among other bequests left, "to my nurse, 2*s.* 6*d.*"

Few save those who have studied the matter can form any idea of the interest, and, indeed, the amusement, that can be derived from a perusal of a mediæval will. These wills were religious documents and were proved in the ecclesiastical courts. In pre-Conquest days wills were made verbally and if reduced later to writing were of a noncupative character; but by the twelfth century it had become usual to record the will in writing, and this was essential if there was any question of a legacy of land, though people were left free to make a verbal disposition of their chattels, if they so desired, until comparatively recent times.

In mediæval times the parish priest had to be present to hear the confession, usually spoken of as the last words, or "novissima verba." From the eleventh to the thirteenth century there was a horror of intestacy amounting to positive dread; it being held that a man dying intestate died unconfessed, and was therefore unfit for burial in consecrated ground. So great was this horror that the stock phrase, "nolens decedere intestatus" is constantly cropping up in the opening sentences of many wills of the period. Another stock phrase, "quia nichil certius morte, nichil incertius hora mortis," which we owe to Bracton, obviously alludes to the uncertainty of life. In the register of John de Peckham, Archbishop of Canterbury, 1279–92, will be found an account of a man who was attacked by robbers and was found by neighbours at death's door; he died before a priest could be brought to him and was buried in the high road. Peckham took a merciful view of the case: "It is said that the poor wretch asked for a priest, if this can be proved, let his body be exhumed and buried in Christian fashion, for he did what he could towards making a testament." This would seem to have been the beginning of an attempt by men to discriminate between the case of a man dying suddenly by accident or disease, "subita et inpreparata morte," and the person, who, lying sick, obstinately refused to utter his last words, and died "desperate" as the saying was.

At this early date it was considered unlucky to make a will when in good health, and in most cases a very short time elapses between the signing of a will and its probation, rarely more than a few weeks elapse and occasionally only a few days. In times of epidemics, such as the plague, men were evidently influenced by fear of imminent peril. In this respect Canon Foster, in his introduction to the magnificent collection of Lincoln wills (Lincoln Record Society, Lincoln Wills, vol. ii., 1918), to which we are much indebted for most of our knowledge of the subject, instances the following: "Of a hole mynde and perfyte remembraunce, preventyng by the grace of God the incerten stroke of dethe and the sodan knockyng and flagicion of Allmighty God, now beyinge in good helthe makyth my last will and mynde."

After having commented on the uncertainty of life the mediæval testator proceeds to leave his soul to the Allmighty and his body to the earth whence it came. The church is almost always mentioned and much money is usually directed to be spent by his executors, that to be spent on wax for candles being usually specified. Before making any other bequests he mentions his mortuary, called in old wills the "principalium." This mortuary, or soul-scot, was a sort of religious heriot allowed by custom to the priest of the testator's parish; it usually took the shape of his best beast or best garment. Selden says that the mortuary was for tithes forgotten, a sort of death bed restitution, like conscience money to the Chancellor of the Exchequer; though this may have been so in some cases, one can find in any collection of old wills numerous examples of money left to the altar of the church for tithes forgotten as well as the mortuary. When we get to the body of the will we find the most entertaining bequests of the goods of the departed, and the reader is often set a pretty puzzle to understand what some of the articles were.

In reference to the dread of dying without making a will, the saying may be recalled of one of the old monkish chroniclers (? Symeon, of Durham), who in recording the death of some man, says that he died in the night and was found by his servants next morning, dead, black, stinking, and intestate!

THE MELANCHOLIA OF SEMMELWEIS.

In his Semmelweis Cup speech delivered at the annual conference of the Budapest Medical Club Prof. Rezsö Bálint discussed the causes of Semmelweis's melancholia which, as is well known, led to his admission to an asylum in 1865 at the age of 47. We often read, he said, even in modern medical literature, that Semmelweis suffered acute distress of mind owing to lack of understanding or misjudgment of his doctrines on the part of his contemporaries, and that throughout his life he felt himself to be persecuted by an inexorable fate. But Semmelweis was not the only man who had to bear this misfortune; many a man of genius, who has sought to divert or accelerate the ordered progress of culture by some unexpected act or discovery, has shared his fate. It has happened not uncommonly in the history of science and the arts that a few individuals of commanding genius have risen high above the level of their contemporaries, and that many years have passed before a later generation has attained the horizon of their outlook, and learned to understand and appreciate them. Brandes says in his book on Goethe that the cultural development of a period, or of a nation, can be measured by the degree of comprehension it shows for the spirit of Goethe—as Auerbach puts it, how "Goethe-ripe" it is.

But the failure to understand and recognise the value of Semmelweis's work was a far more serious matter than the inability to appreciate Goethe's poetry. If a man is unable to enjoy Goethe his loss is spiritual only, but the failure of contemporary scientists to comprehend Semmelweis's theory, and their refusal to put it to a practical test, sacrificed the lives of thousands. And yet how simple was the truth which he proclaimed, how much more difficult and confused the lines of thought on which his opponents sought for a solution of the problem—the discovery of the cause of puerperal fever. Telluric, atmospheric, cosmic changes, psychic influences, and other factors difficult of analysis distracted their minds, and the simple truth which flashed upon Semmelweis in all its splendour when he compared the death-rates of the two sections of the Viennese Obstetrical Clinic made no appeal to them. The very fact that the doctrines found access with difficulty to the minds of his contemporaries is proof of their magnificence. What freedom from prejudice, from bondage to accepted doctrines, what intellectual daring it required to recognise so revolutionary a truth and champion it with zeal against all assailants! In his open letter to Spaeth, Semmelweis wrote: "You also take part in this slaughter, Professor! But the killing of women wholesale must be stopped, and I myself will stand sentinel. Anyone daring to proclaim dangerous doctrines about puerperal fever will find in me a doughty opponent." The fact that his theory was not recognised caused him pain, not from vanity, but because he knew that its non-acceptance was costing many a mother her life. This painful consciousness perturbed and depressed him, but could not diminish the happiness of the knowledge that a new truth, to which thousands would owe their lives, had originated in his brain.

It cannot be true, said Prof. Bálint, that great souls are made unhappy by the failure of the world to understand them. Man may strive in all his thoughts and acts to attain

contentment, but true happiness is experienced only by those who find it in themselves.

Erquickung hast du nicht gewonnen,
Wenn sie dir nicht aus eigner Seele quillt.

Are we justified in assuming, from the sullenness of Beethoven's face, from the gloomy utterances in which he indulged, that this great soul was unhappy? Does not the Ninth Symphony resound with joy? Is there one of his works that is not dominated by gaiety? Surely Beethoven could not have composed music that was not a reflection of his own feelings. Great souls like these, confronted with human ill-will or uncomprehension, find these but trifling vexations in comparison with the supreme contentment that dominates their souls. Can we imagine that Semmelweis would have sacrificed this great truth to win the applause of his contemporaries?

VITAMIN C IN LIVER.

THE use of liver and liver extracts in the treatment of pernicious anæmia has led to the study of these substances as a therapeutic agent in other disorders. In the nutritional diseases of infancy and childhood some observers claim excellent results with various forms of liver diet. That liver contains fat-soluble vitamin is, of course, well known, but a certain amount of research has also been undertaken upon its antiscorbutic value, dependent on the presence of vitamin C. H. Aron, H. Hirsch-Kauffmann, and E. Schädrich[1] have conducted experiments on guinea-pigs, using as a control basis a scurvy-producing diet consisting of 20 g. of sterilised oats and 30 g. of sterilised milk daily. In three animals this produced in about three weeks typical scorbutic collections of blood in the neighbourhood of the ends of the long bones and these changes could be demonstrated by the X rays. In a fourth animal a portion of the oats was replaced by pulped liver so that the protein intake was the same as in the control animals. This form of liver was, however, not relished by the animal and failed to prevent the appearance of scurvy. Consequently it was decided to employ a water extract of fresh liver and this was prepared by pounding 60 g. of liver pulp with 60 c.cm of water in a mortar and allowing it to stand in an ice-chest for 24 hours. The mixture was then filtered and a somewhat cloudy, bright red filtrate obtained.

About 5 to 6 c.cm. of this liver juice appeared to be equivalent to 7·5 g. of fresh ox liver, and daily administration of this amount of liver prevented scurvy in guinea-pigs fed on the scorbutic diet mentioned above. On testing the thermostability of the liver extract it was found that heating for five minutes in a boiling water-bath considerably altered its colour and consistency, but left its antiscorbutic power unaffected. Alcoholic extracts of fresh liver, the residue of these extraction processes, and a preparation called "hepatrat" were found to have no antiscorbutic power such as the simple water extract had shown.

These studies are interesting as indicating how the vitamin C content of liver may best be obtained for therapeutic purposes. So far as infantile scurvy is concerned a new antiscorbutic preparation is hardly wanted, since cases can readily be cured with fresh fruit juice, unboiled milk, and such substances as "potato cream." It is possible, however, that some infants would tolerate a water extract of liver better than fruit juice as a prophylactic agent.

THE GUARDIANSHIP SOCIETY.

THE work of the Guardianship Society, which has its headquarters at Brighton, was described in the sixteenth annual report presented on March 23rd. The object of the Society is the care and supervision of the mentally and physically defective, and other special cases, and during 1928 no fewer than 876 persons were under care, while another 70 cases had been visited voluntarily in their homes and otherwise helped, bringing the total number of persons assisted or supervised to 946. This figure does not include after-care patients, in which category there were 225 on the register at the end of the year, an increase of 88 in the 12 months. The persons under care may be classified as follows:—

Certified under Mental Deficiency Act	425
In a "place of safety"	3
Notified under Section 51	90
Under single care under the Lunacy Act	9
Physical defectives and others boarded-out	260
Under statutory supervision in their own homes	89
Total	876

The Society's clinic for nervous disorders has been open now for three years, and 48 sessions were held in 1928, 102 patients (45 male, 57 female) being treated. The Society has two homes in the country—at Dungates, and Jarvis Brook, Sussex—and at the latter place another home has been started where backward boys, and a certain number of lads on licence, are trained in gardening, and rabbit and pig breeding. There are two industrial class centres—one in Brighton and one in Hove—and there is also a special school for defective children in Hove. Interest and financial help is urgently needed for the furtherance of this work among the mentally and physically defective. At the annual meeting a high tribute was paid to the work of the hon. secretary, Miss Grace Woodhead, under whose guidance the administrative expenses are only 3¼ per cent.

Dr. Crichton Miller addressed the meeting on the Duty of Society towards the Subnormal Child. He pointed out that instead of the ordinary problem of educating the individual so that he might adjust himself to his environment the Society were faced with that of devising an environment suited to the individual.

[1] Jahrb. f. Kinderheilk., 1929, cxxiii., 1.

THE PANEL SYSTEM IN BIG TOWNS.

To the Editor of THE LANCET.

SIR,—With regard to the letter of "Aggrieved" in your issue of Feb. 23rd (p. 426) which has just been brought to my notice, I feel that, both as a panel practitioner and one of those requested to attend by "Aggrieved," I should like to answer. The charge against the panel practitioner is that he "may reap the fees while other doctors do the work." This is due to a misconception on the part of "Aggrieved." No medical man reaps fees on account of maids who are on no one's panel list. "Aggrieved" does not realise that insurance work is contract work. One agrees to attend at all times patients on one's panel, and other insured patients in emergency, whether on one's panel or not. There was no obligation to attend "Aggrieved's" maid on either of these counts. A case of influenza in the house of a doctor is scarcely an emergency.

In addition, I should like to remind "Aggrieved" that the request from an employer to take his maids on to one's panel, with the proviso that he would pay for the first visit as a private one is always insulting, and doubly so in the case of one doctor to another. As regards difficulty in getting drugs dispensed at certain hours, this of course exists, and is usually well met by giving domestic remedies. Were no aperients, no aspirin present in "Aggrieved's" own house?

I am, Sir, yours faithfully,
PANEL PRACTITIONER.

Pimlico-road, S.W., March 28th, 1929.

THE PUBLIC SCHOOLS YEAR BOOK.

THIS year book, which is the official book of reference of the Headmasters' Conference, now appears for the fortieth time (London: H. F. W. Deane and Sons. Price 10*s.* 6*d.*) It contains a list of the public secondary schools represented on the Conference and the Editors have spared no efforts in making the information accurate and complete. Parents will be interested in the sections dealing with the entry to the services, professions, and various business careers. Scholarships given in aid of medical study are set out at length in a table of 26 pages in a most serviceable way. There is an alphabetical list of old and new works of reference concerning schools and colleges or their historical memorials, lives of headmasters, school registers, magazines, and so forth. For instance, the reader is referred to "Our Schools and Colleges" by Captain Frederick Shirley de Carteret-Bisson, the fourth edition of which was published in January, 1879. This book, now out of print, was a veritable mine of educational information in the seventies. Details of public schools outside the Headmasters' Conference are not included in the year book, the conditions under which a school may be represented being briefly stated in the preface. Parents, schoolmasters, and boys will all find interesting information and records in the book.

"TRANSPULMIN" IN TUBERCULOSIS.

Harlan F. Newton and Kurt Heine[1] report beneficial results from the intramuscular injection of transpulmin. This is a sterile solution of basic quinine and camphor in ether oils. Quinine accumulates in the lungs and together with the ether oils is said to exert an antisecretory effect upon the mucous membranes of the lung tubes. The success attending the use of transpulmin in chronic bronchitis, pulmonary abscess, and bronchiectasis led the authors to try its effect on 40 cases of pulmonary tuberculosis. The selected cases were of the productive and cirrhotic types, acute infections and those of the cavernous type being excluded as unsuitable. Treatment was continued daily for three to five weeks. Favourable effects were noted in 28 patients, cough was relieved, fever diminished, expectoration reduced, and tubercle bacilli banished from the sputum in all but two of the cases. No ill-effects were noted, while decrease in physical signs and improvement in the X ray picture resulted.

[1] Amer. Rev. of Tuberc., 1928, xviii., 563.